Section 4 Zone 11 Kaka‘ako Makai (Test Excavations 226 to 232A)

4.1 Overall Location

For reporting purposes for this AIS, the City Center Section 4 of the HHCTCP has been divided into 11 zones based on geographical and cultural boundaries. The Kaka‘ako Makai Geographic Zone is located within the central portion of Honolulu Ahupua‘a, Honolulu District, Island of O‘ahu, in a physiographic division known as the Honolulu Plain (Armstrong 1983:36). The Kaka‘ako Makai portion of the City Center Section 4 is an additional utility re-location route that extends approximately 1,250 m forming a *makai* loop off the main HHCTCP alignment (Figure 25). Where the main HHCTCP line heads toward Halekauwila Street approximately 100 m southeast of the Downtown Station, the utility relocation route continues to head south on Nimitz Highway. The utility relocation route makes a sharp turn heading *mauka* (northeast) off Nimitz Highway onto Punchbowl Street and then turns southeast on Pohukaina Street running parallel and one block *makai* of the main HHCTCP route on Halekauwila Street. The utility re-location route then reconnects with the HHCTCP alignment by turning *mauka* (northeast) on Cooke Street to rejoin the main HHCTCP alignment at the intersection of Halekauwila and Cooke Streets.

A total of 16 test excavations (T-226 through T-232, T-226A, T-226B, T-226C, T-226D, T-227A, T-228A, T-228B, T-231A, and T-232A) were excavated in the Kaka‘ako Makai Zone along and adjacent to Punchbowl, Pohukaina, and Cooke Streets. Test excavation numbering generally progresses from northwest to southeast. Testing in this zone was less dense because of the high likelihood that the northwest portion of the Zone (northwest of Punchbowl Street) was off-shore shallows into the mid-1800s.

All of these Kaka‘ako Makai test excavations are within City and County of Honolulu road right-of-ways. Seven of the test excavations (T-226, T-226A, T-226B, T-226C, T-226 D, T-227, and T-227A) are along Punchbowl Street within TMK [1] 2-1-027; seven test excavations (T-227B, T-228, T-228A, T-229, T-230, T-231, and T-231A) are along Pohukaina Street within TMK [1] 2-1-030, [1] 2-1-051, and [1] 2-1-054; and two (T-232 and T-232A) are along Cooke Street within TMK [1] 2-1-052.

4.2 Transit Infrastructure

Transit infrastructure for the current project within the Kaka‘ako Makai Zone consists entirely of utility relocation corridors (electric lines, storm drains, sewers, water lines, and telecommunications). All test excavations within the Kaka‘ako Makai Zone focused on the utility relocation corridors (T-226 through T-232, T-226A, T-226B, T-226C, T-226D, T-227A, T-228A, T-228B, T-231A, and T-232A) (see Volume I).

4.3 Geography, Geology, and Land Forms

The northwest portion of the Kaka‘ako Makai Zone is believed to have been coastal shallows into the mid-1800s (see Volume II). The most inland portion (where Cooke Street connects with Halekauwila Street) would have been approximately 400 m inland of the natural coastline.

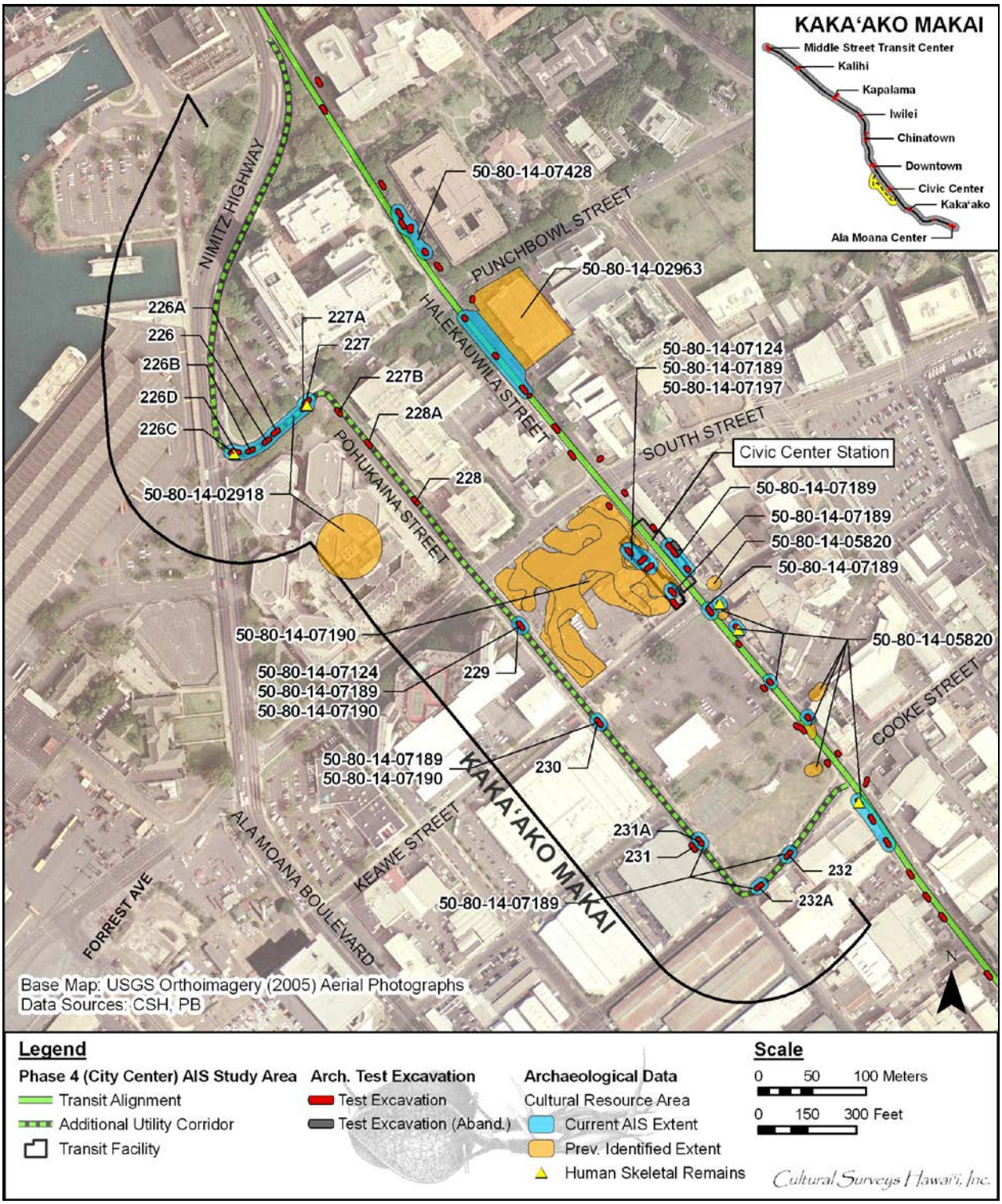


Figure 25. Aerial photograph (source: U.S. Geological Survey Orthoimagery 2005) showing the location of the Kaka‘ako Makai Zone AIS test excavations (T-226 through T-232) along the *makai* utility re-location route

Present day elevations in the zone range from approximately 1.4 to 1.9 m amsl. Portions of the project area were in fishponds.

The average annual rainfall in this area measures approximately 658 to 698 mm (26 to 28 in) (Giambelluca et al. 2011), which would be marginal at best for non-irrigated agriculture. Nu‘uanu Stream approximately 900 m to the northwest would have been a major source of fresh water. The Kaka‘ako area to the east was known for its springs.

The Kaka‘ako Makai Zone consists of a portion of the broad elevated coral reef in southern Oahu that probably formed during the 7.5-m (Waimanalo) stand (Macdonald et al. 1983:420–421). Most of the Kaka‘ako Makai Zone was in the shallows of, or just inshore of, the main natural entrance channel to Honolulu Harbor. The landscape would have been dominated by the bay formed by Pākākā Point (with Kuloloia Beach) on the north side and Kaholoakeāhole point on the south side. The deep channel and bay would probably have been a focus of fishermen for centuries. Pākākā Point was a logical choice for the construction of the Honolulu Fort that would dominate the waterfront for decades.

Vegetation in this area is not well documented, but just prior to development in the early twentieth century is believed to have included *naupaka* (*Scaevola taccada*), *kiawe* (*Prosopis pallida*), and *niu* (*Cocos nucifera*). Present vegetation is almost entirely the result of landscaping efforts.

According to the U.S. Department of Agriculture Soil Survey Geographic (SSURGO) Database (2001) and soil survey data gathered by Foote et al. (1972), soils within the Kaka‘ako Makai Zone consist predominantly of Fill land, with an area of Ewa silty clay loam (EmA) in the central portion of the zone (Figure 2). Fill land soils are described as follows:

> …areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources…. This land type is used for urban development including airports, housing areas, and industrial facilities. [Foote et al. 1972:31]

Ewa silty clay loam soils are described as the following:

> …well-drained soils in basins and on alluvial fans…[that] developed in alluvium derived from basic igneous rock... These soils are used for sugarcane, truck crops, and pasture. The natural vegetation consists of fingergrass, kiawe, koa haole, klu, and uhaloa. [Foote et al. 1972:29]

4.4 Traditional and Historic Land Use

4.4.1 Traditional Accounts of the Kaka‘ako Makai Zone

The Kaka‘ako Makai Zone encompasses traditional land areas known as Kaka‘ako and Ka‘ākaukukui. According to Pukui and Elbert (1986:110), the Hawaiian word *kākā‘ākо* can be translated as “dull, slow.” Thrum (1923:639) translated the word as “prepare the thatching” (*kākā* = to chop, beat, or thresh; *ako* = thatch). If Thrum’s translation is correct, it could be related to the fact that salt marshes, such as areas like Kaka‘ako, were excellent places to gather tall *pili* grass, which the Hawaiians traditionally used to thatch their houses. Pukui et al. (1974) translate the word Ka‘ākaukukui as “the right (or north) light,” possibly referring to a maritime navigation landmark, and described the area as a “filled-in reef.” According to Kekahuna

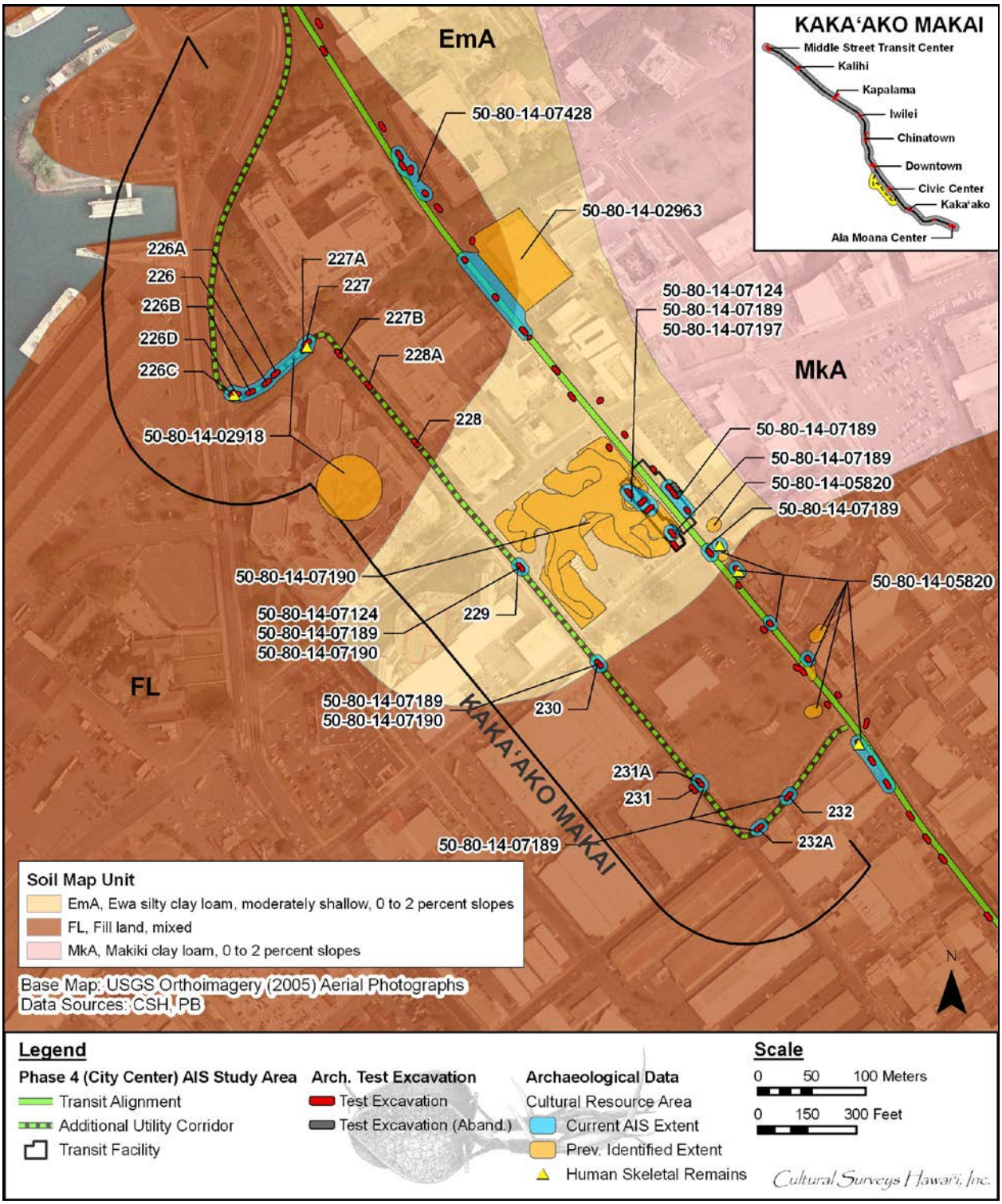


Figure 26. Aerial photograph (source: U.S. Geological Survey Orthoimagery 2005) with overlay of the Soil Survey of Hawai‘i (Foote et al. 1972) showing sediment types within and in the vicinity of the Kaka‘ako Makai Zone

(1958:4), Ka‘ākaukukui was “a beautiful sand beach that formerly extended along Ala Moana Park to Kewalo Basin, a quarter mile long reef extended along the shore.”

Ka‘ākaukukui is briefly mentioned in the legend of Hi‘iaka. Hi‘iaka and her companions had been traveling around O‘ahu on the land trails, but decided to travel from Pu‘uloa to Waikīkī by canoe. At Pu‘uloa, Hi‘iaka met a party that planned to travel to the house of the chiefess Pele‘ula in Waikīkī. Hi‘iaka recited a chant, telling the people that although they were going by land and she was going by sea, they would meet again in Kou. One portion of the chant mentions Ka‘ākaukukui, with reference to a pool, possibly a reference to the salt ponds of the area.

Kaka‘ako is briefly mentioned as a stopping point during ‘Ai‘ai’s travels around the island in Thrum’s version of the legend of the god Kū‘ula and his son ‘Ai‘ai.

4.4.2 LCA Documentation

Among the first descriptions of the Kaka‘ako area by the Hawaiians themselves are the testimonies recorded during the 1840s in documents associated with LCA and awardees of the Māhele. The LCA records indicate that the traditional Hawaiian usage of the region and its environs may have been confined to salt making, farming of fishponds, and wetland agriculture (see Volume III Appendix E). The testimonies indicate that the area was lived in and shaped by Hawaiians prior to the nineteenth century. The LCA records also reveal that midway through the nineteenth century, taro cultivation, traditional salt making, and fishpond farming continued in this area. These activities and the land features that supported them would later be eliminated or buried during the remainder of the nineteenth century by the urbanization of Honolulu.

Four LCAs were awarded in the vicinity of the Kaka‘ako Makai Zone: 247 Part 12, 3455, and 7712:6 Lot 2 (Table 5, Figure 27, and Figure 28).

LCA 7713, the ‘*ili* of Ka‘ākaukukui, was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. Ka‘āaukukui consisted of three non-contiguous sections.

LCA 7712 was awarded to Mataio Kekūanao‘a, a high-ranking *ali‘i* who was a close friend of Kamehameha II and was married to Kīna‘u, the daughter of Kamehameha I.

Table 5. LCAs in the vicinity of the Kaka‘ako Makai Zone (in numerical order)

LCA Number	Contents of Award
247 Part 12	One of 12 house lots and store lots claimed for W. C. Lunalilo by Charles Kanaina
3455	One house lot to Kaule for Liliha
7712:6 Lot 2	Lands to Mataio Kekūanao‘a
7713	Ka‘ākaukukui ‘Ili to Victoria Kamāmalu

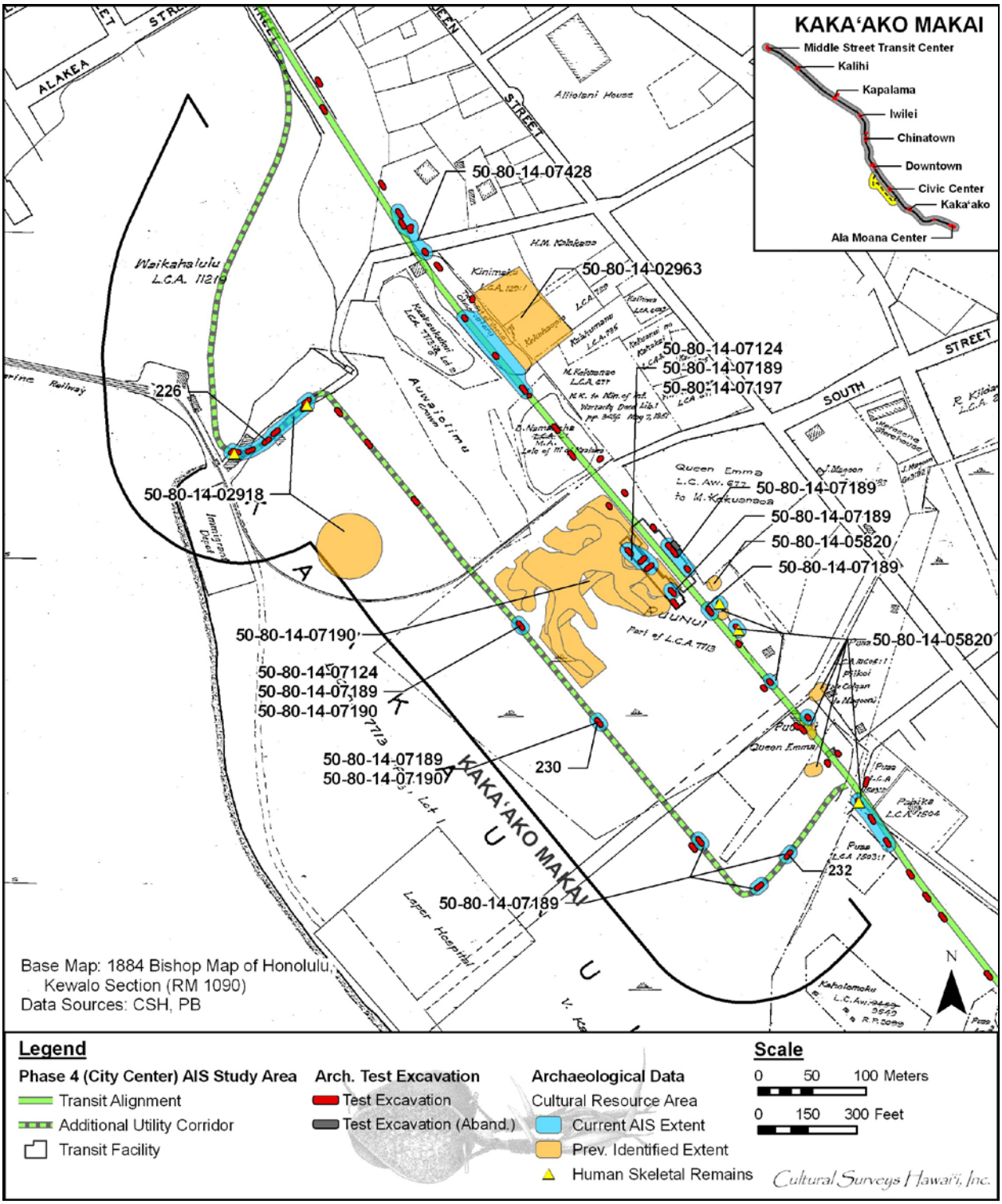


Figure 27. 1884 map of Honolulu, Kewalo Section, by S. E. Bishop (RM 1090) showing the locations of LCAs in the vicinity of the Kaka‘ako Makai Zone AIS excavations and the HHCTCP corridor

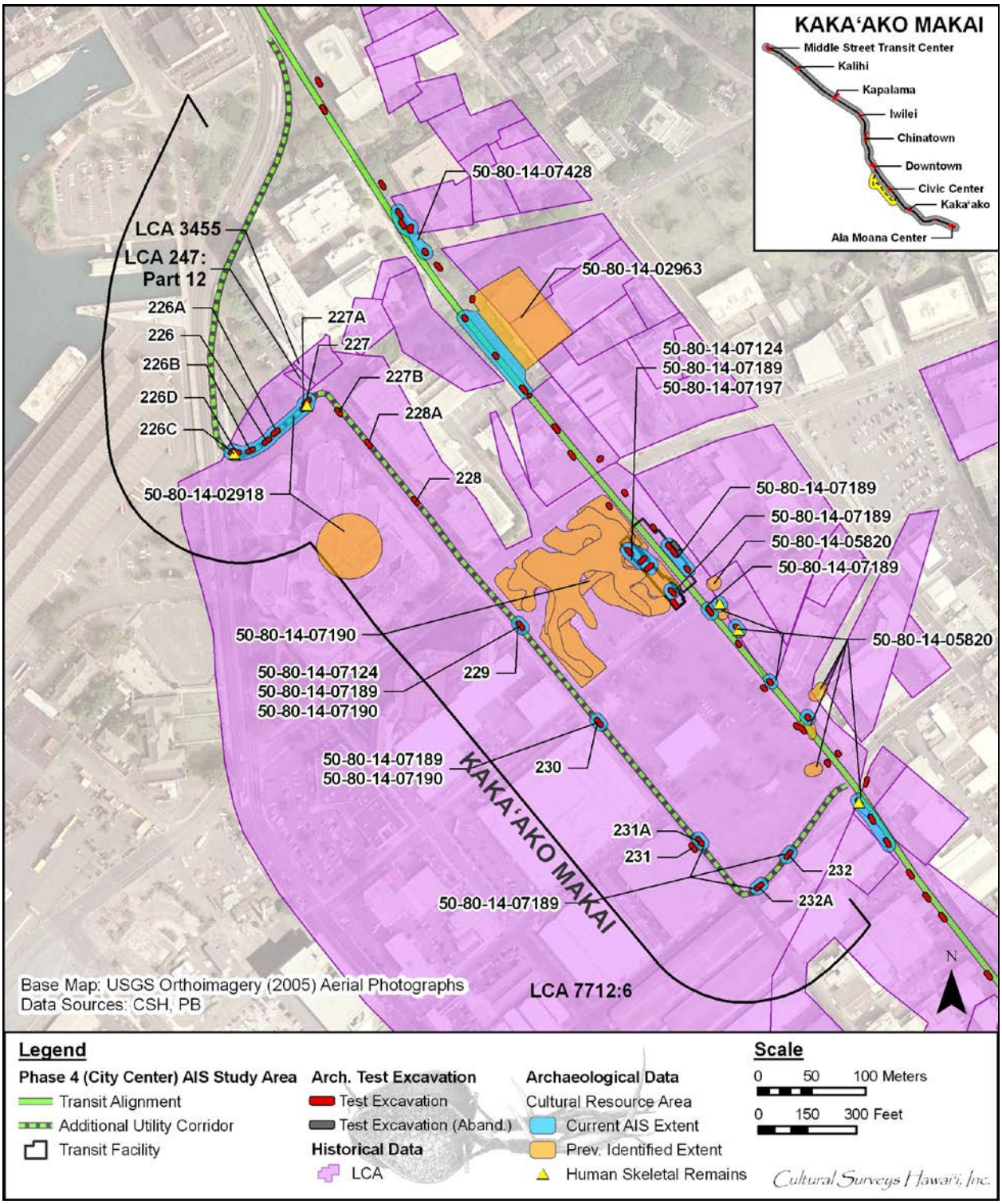


Figure 28. Aerial photograph (base map: U.S. Geological Survey Orthoimagery 2005) showing the locations of LCAs in relation to the Kaka‘ako Makai Zone AIS excavations along the HHCTCP corridor

4.4.3 Historic Land Use

Kaka‘ako was considered outside the Honolulu town boundary and was used up to and through the nineteenth century for salt production and as a place for cemeteries, burial grounds, and for the quarantine of contagious patients. Then, in the beginning of the twentieth century, the area was used as a place for sewage treatment and garbage burning, finally becoming an area for cheap housing and commercial industries (Griffin et al. 1987:13).

From pre-Contact through the post-Contact era, salt production was a major endeavor in the Kaka‘ako area. Hawaiians used *pa‘akai* (salt) for a variety of purposes: to flavor food, to preserve fish, for medicines, and for ceremonial purposes. In the years following the first sightings of the Hawaiian Islands by Captain Cook in 1778, most visitors to the islands were British and American fur traders who stopped in Hawai‘i on their way to China. One reason for their visit was to buy or trade for salt, which was used to cure the seal and mammal pelts collected from the Northwest Coast. An 1883 map of the Honolulu Water Works System shows the extent of salt production within the Kaka‘ako area (see Volume II). The area of salt pans is marked out as a large grid of contiguous squares located at the southeast end of the Kaka‘ako Makai Zone.

The export of salt declined in the late nineteenth century. Thrum (1924:116) states that the apex of the trade was in 1870, and by 1883 he noted that “pulu, salt and oil have disappeared entirely” from the list of yearly exports (Thrum 1884:68). By 1901, most of the fishponds and salt pans *makai* of King Street were reported as abandoned.

The city block now bounded by Punchbowl Street, Pohukaina Street, South Street, and Ala Moana Boulevard (containing the Waterfront Plaza complex), adjacent to the Kaka‘ako Makai Zone, was used as a cemetery from the 1700s (or earlier) up to the early 1800s. The burial ground is currently referred to as the “Ka‘ākaukukui Cemetery,” but its ancient name, if it had one, is unknown.

In 1881, just *makai* of the Kaka‘ako Makai Zone, within the city block now bounded by Ala Moana Boulevard, Keawe Street, Auahi Street, and Coral Street, a branch hospital and receiving station for cases of Hansen’s Disease was opened (Griffin et al. 1987:55). This land, at “Fisherman’s Point,” was donated by Princess Ruth Ke‘elikōlani. The “Leper Hospital” is indicated on the 1884 map of Honolulu (see Figure 27). In 1888, the Board of Health decided to close the Kaka‘ako Branch Hospital and move the receiving station to Kalihi. However, Thrum (1897:101) reports that victims of the cholera epidemic of 1895 were treated at the Kaka‘ako Hospital, indicating that remaining buildings were modified or a new hospital was built during this time.

By the 1880s, infilling of the mud flats, marshes, and salt ponds in the greater Kaka‘ako area had begun. This work was performed for public health and sanitation reasons, for the construction of new roads and the improvement of older roads, and to provide more room for residential subdivisions, industrial areas, and tourist resorts. The first fill material may have been set down in 1881 for the Kaka‘ako Leper Branch Hospital, which had been built on a salt marsh. In 1900, the Honolulu Iron Works moved to the shore at Kaka‘ako on land that had been filled from dredged material during the deepening of Honolulu Harbor (Thrum 1901:172). A sewer pumping station, an immigrant station, and a garbage incinerator were also built on “reclaimed land.”

In 1913, Pohukaina School was moved to Kaka‘ako within the current city block bounded by Pohukaina, Keawe, Halekauwila, and Coral Streets, adjacent to the Kaka‘ako Makai Zone. Pohukaina School remained in operation in Kaka‘ako until 1980, by which time it had developed into a special education facility. The buildings were demolished and, in 1981, the Pohukaina School special education program was transferred to the campus of Kaimukī Intermediate School. In 1937, Mother Waldron Playground was opened across Coral Street from Pohukaina School.

Early twentieth century maps depict the expanding urbanization of Honolulu (Figure 29 through Figure 33). The 1914 Sanborn Series maps show many industrial buildings and warehouses along the Kaka‘ako Makai Zone, a U.S. Naval Station at the northwest end of the zone, and Pohukaina School and the City and County Stables at the southeast end (see Figure 29). The 1927 Sanborn Series maps depict a U.S. Army Reservation next to the U.S. Naval Station at the northwest end of the Kaka‘ako Makai Zone, followed by the Honolulu Iron Works farther south along the zone corridor, then the Pacific Engineering Company, Ltd., Pohukaina School, and a large playground (see Figure 31). The 1950 Sanborn Series maps show further industrialization of the area (see Figure 32).

4.4.4 Settlement Pattern Summary

The land around the West Kaka‘ako Zone in Honolulu Ahupua‘a offered desirable environmental conditions for traditional Hawaiian subsistence practices. The coastal area in the vicinity of the Kaka‘ako Makai Zone consisted of extensive swamp lands used for fishponds and salt pans along with occasional taro *lo‘i* and habitation. The taro *lo‘i* were more predominant in the western portion of the zone, while salt pans were more predominant in the drier, eastern portion of the zone. Habitation was likely scattered along the shore and along trails that connected Honolulu to Waikīkī.

4.5 Previous Archaeology

Numerous archaeological studies have been conducted in the vicinity of the Kaka‘ako Makai Zone, including 13 conducted within or directly adjacent to the zone (Figure 34). Table 6 lists and summarizes the 13 studies conducted in the immediate vicinity of the zone and they are described in more detail below. The discussion of previous archaeological investigations proceeds generally from west to east.

Water Main Installation on Aloha Tower Drive (Hazlett, Fehrenbach, and Hammatt 2008)

In 2007, CSH completed archaeological monitoring for a water main installation on Aloha Tower Drive. No historic properties were encountered during project construction. Observed stratigraphy consisted entirely of fill associated with modern road and utility construction as well as historic land filling activities associated with the expansion of Honolulu Harbor. Documented fill sediments consisted of dredge material associated with the construction of Honolulu Harbor, as well as terrestrial sediments imported from other land areas of O‘ahu.

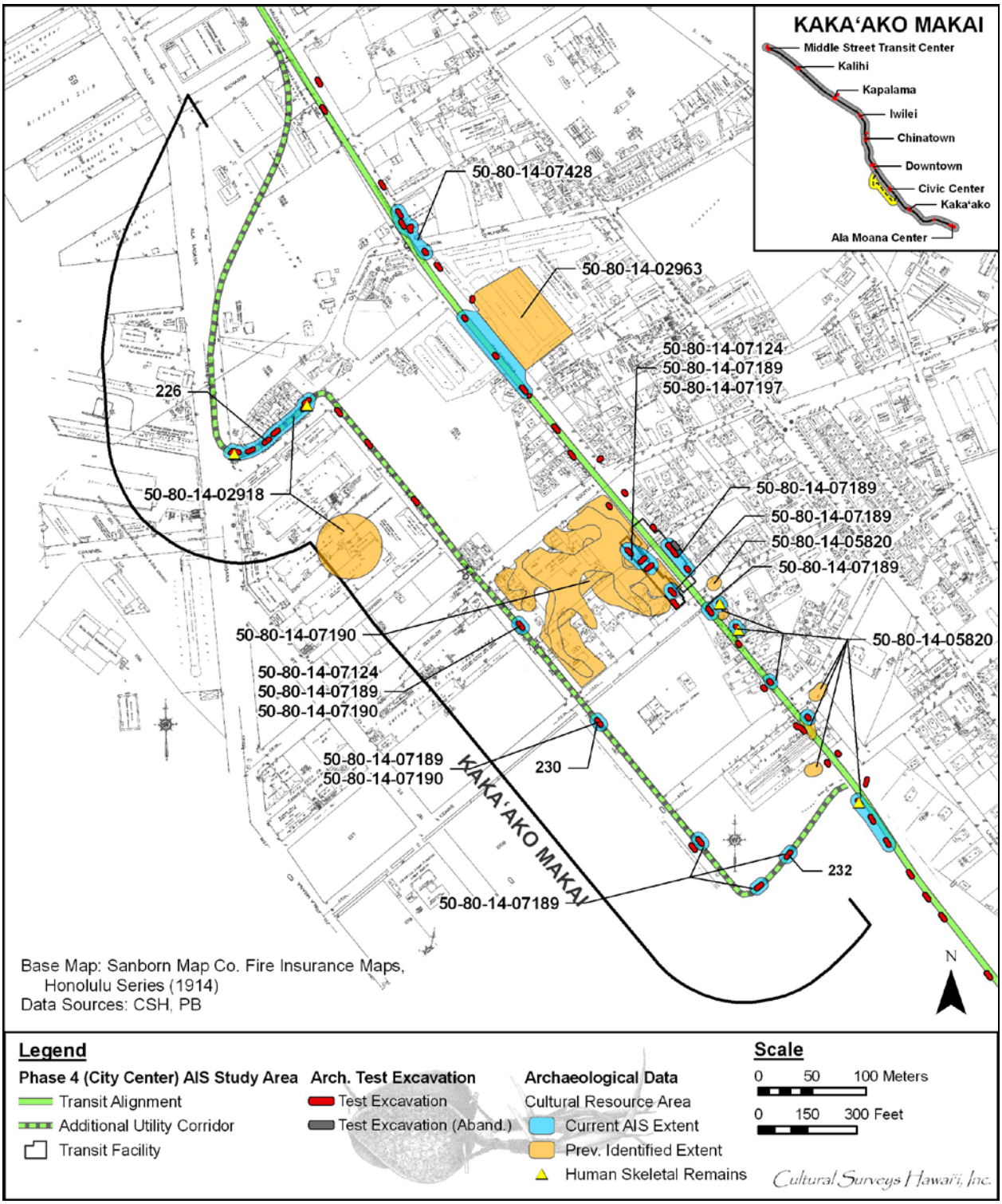


Figure 29. 1914 Sanborn Series maps showing many industrial buildings and warehouses along the Kaka‘ako Makai Zone corridor

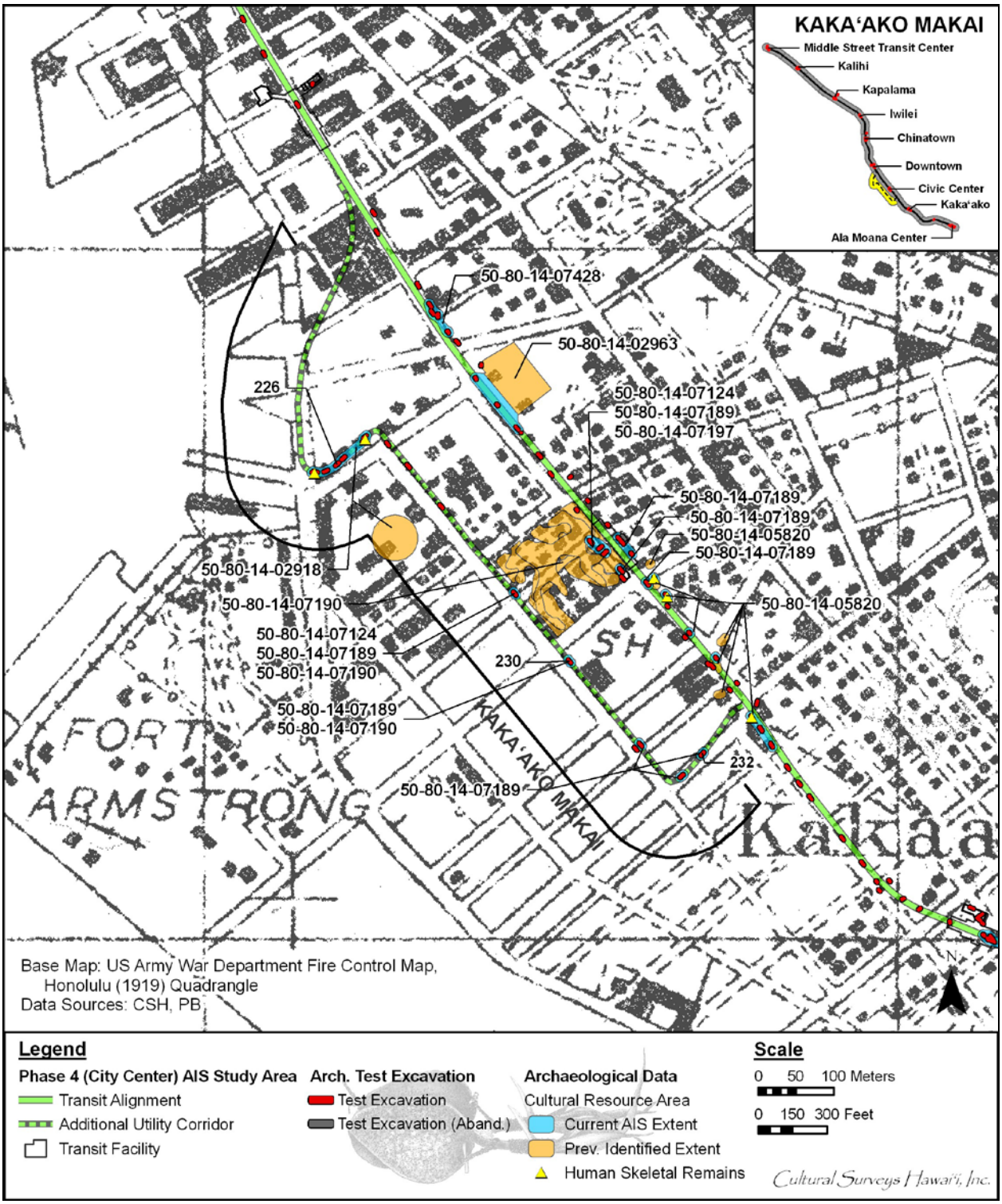


Figure 30. 1919 U.S. Army War Department Fire Control map, Honolulu Quadrangle, showing urbanization in the vicinity of the Kaka‘ako Makai Zone

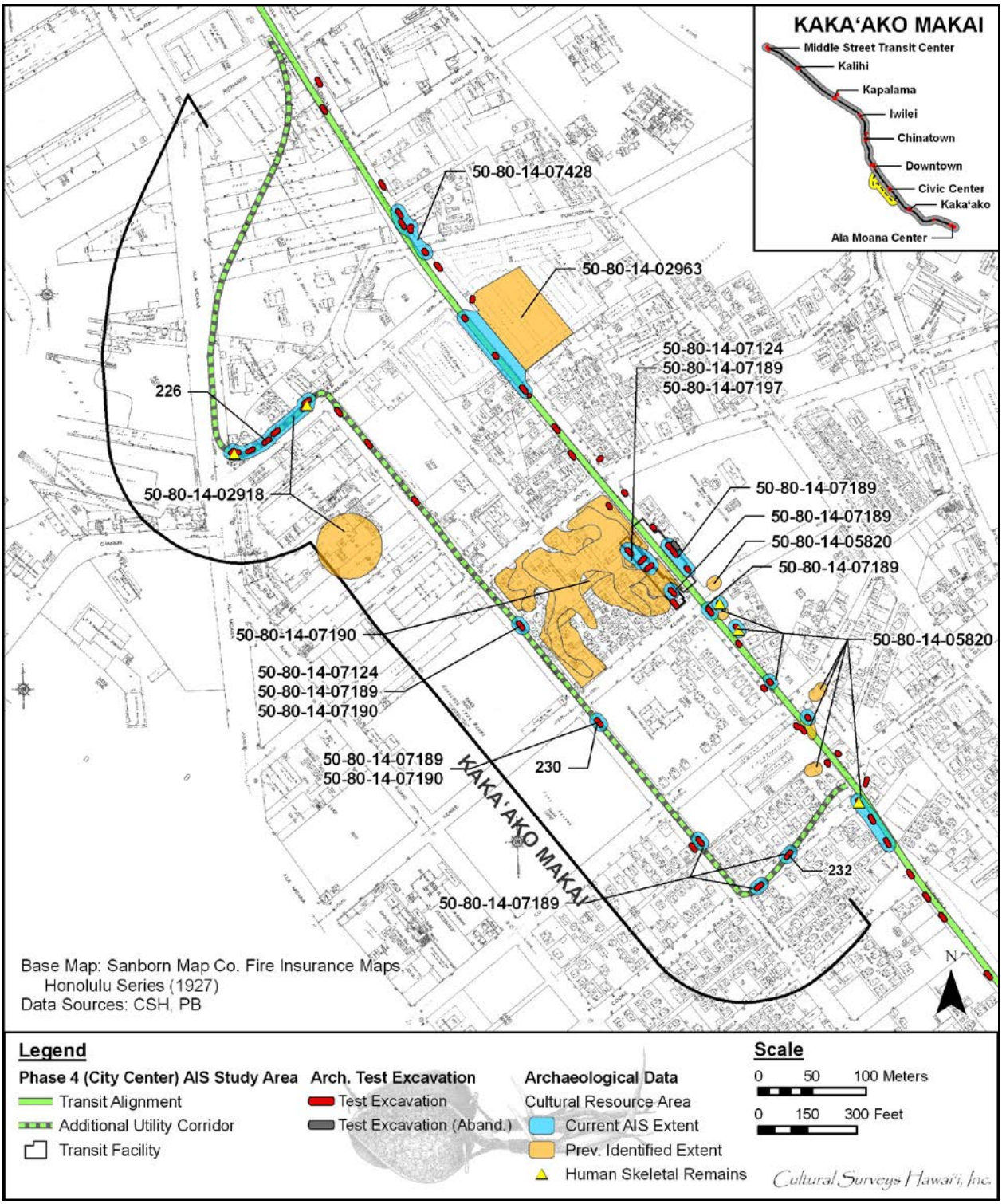


Figure 31. 1927 Sanborn Series maps showing development in the vicinity of the Kaka‘ako Makai Zone

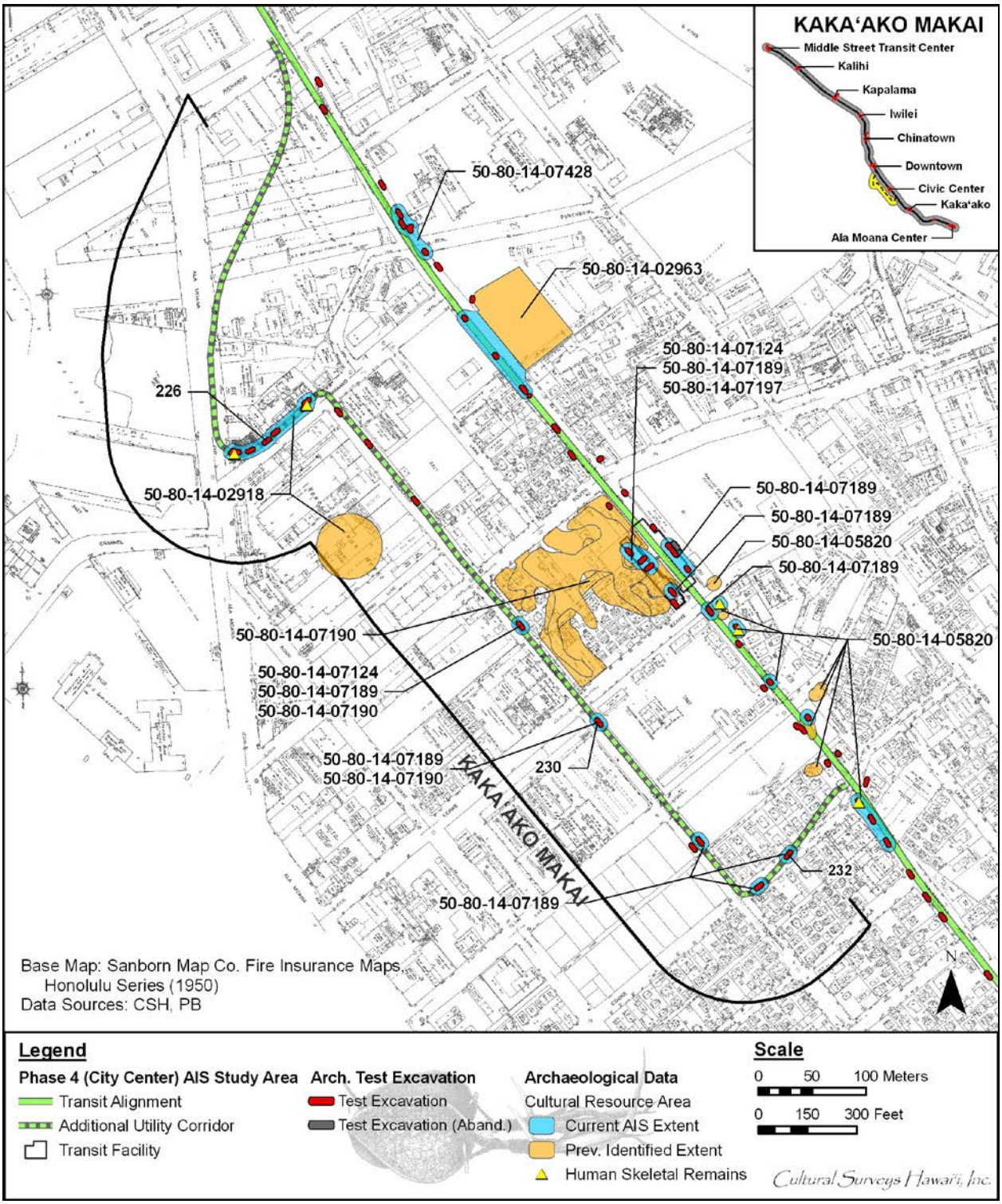


Figure 32. 1950 Sanborn Series maps showing further industrialization of the Kaka‘ako Makai Zone vicinity

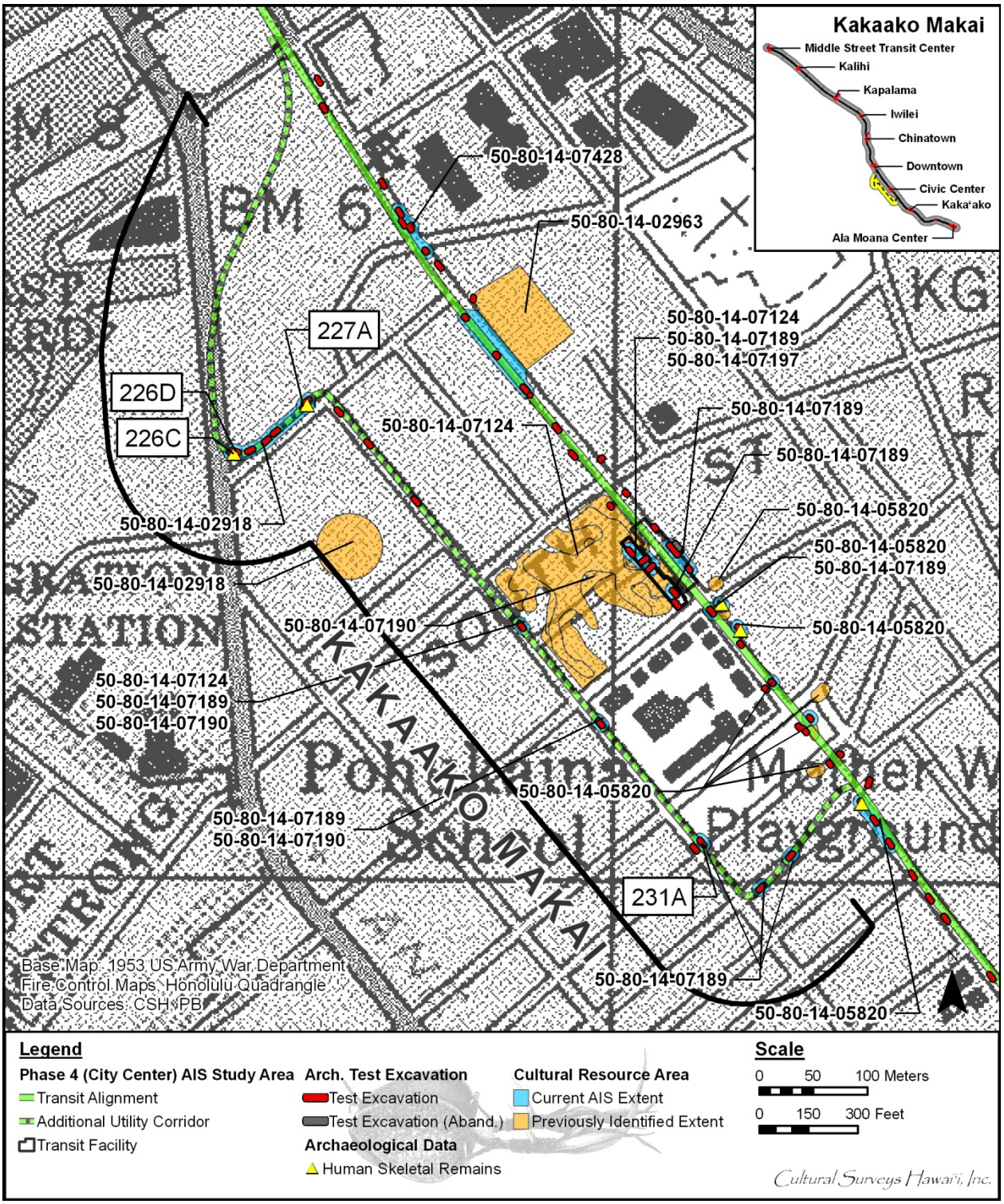


Figure 33. 1953 U.S. Army Mapping Service map, Honolulu Quadrangle, showing development in the vicinity of the Kaka‘ako Makai Zone

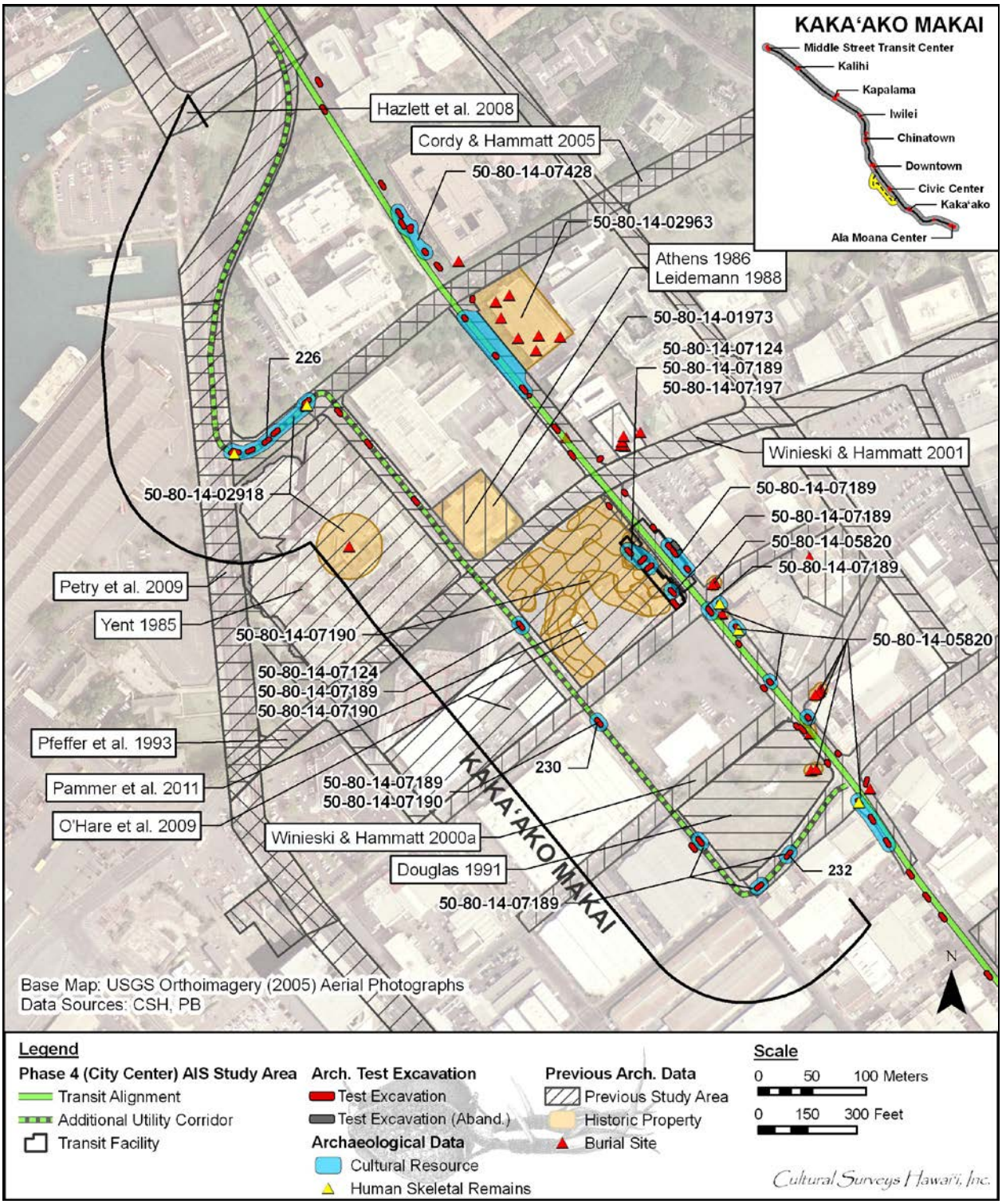


Figure 34. Previous archaeological studies conducted in the immediate vicinity of the Kaka‘ako Makai Zone

Table 6. Previous archaeological studies conducted in the immediate vicinity of the Kaka‘ako Makai Zone (arranged chronologically)

Author	SIHP #50-80-14	Report Description and Findings
Yent 1985	-2918	Burial excavation report for the Ka‘ākaukukui Cemetery at the Honolulu Ironworks project area; five burials documented and disinterred
Athens 1986	-1973	Archaeological monitoring report for the Federal Judiciary Building Parking Complex; historic deposits with artifacts dating from the late nineteenth to early twentieth centuries
Leidemann 1988	-1973	Artifact analysis report for the Federal Judiciary Building Parking Complex; artifacts dated to between 1880 and 1930
Douglas 1991	-4380	Burial report; burial determined to an adult female of Polynesian ancestry; an immature pig burial was associated with the burial and believed to represent a pet
Pfeffer, Borthwick, and Hammatt 1993	-3712; -4532; -4533; -4534	Archaeological monitoring and data recovery report for Kaka‘ako Improvement District 1; 149 burials documented from four burial sites (two cemeteries and two isolated burials)
Winieski and Hammatt 2000a	-1388; -4380; -5820	Archaeological monitoring report for Kaka‘ako Improvement District 3; documented 20 human burials
Winieski and Hammatt 2001	-5942	Archaeological monitoring report for the Nimitz Highway Reconstructed Sewer Project; one historic property encountered: a remnant of a light-gauge rail associated with the historic Honolulu Rapid Transit trolley system
Cordy and Hammatt 2005	N/A	Archaeological monitoring report for Punchbowl Street; no historic properties identified
Hazlett, Fehrenbach, and Hammatt 2008	N/A	Archaeological monitoring for water main installation on Aloha Tower Drive; no historic properties encountered.
O’Hare, Tulchin, Borthwick, and Hammatt 2009	N/A	Archaeological inventory survey plan with limited subsurface testing for three Kamehameha Schools Kaka‘ako Mauka parcels; no historic properties identified.
Petrey, Hazlett, Borthwick, and Hammatt 2009	N/A	Archaeological monitoring report for the Nimitz Highway and Ala Moana Boulevard Resurfacing Project; no historic properties encountered.

Author	SIHP #50-80-14	Report Description and Findings
Pammer, Fong, and Hammatt 2011	-7124; -7189; -7190; -7197	Archaeological inventory survey of the Block 2 Parking Lot for Kamehameha Schools; documented four historic properties: SIHP #50-80-14-7124 historic building remnants; SIHP #50-80-14-7189 a layer of burned historic debris; SIHP #50-80-14-7190 old salt pan remnants; and SIHP #50-80-14-7197 a sandy buried cultural layer.
Dagher and Spear 2013 (draft)	-7260	Burial site component of a data recovery plan; documented a partial set of human skeletal remains from the east corner of Halekauwila Street and Cooke Street.

Nimitz Highway/Ala Moana Boulevard Resurfacing (Petrey et al. 2009)

The Petrey et al. (2009) study was an archaeological monitoring program for resurfacing along Nimitz Highway and Ala Moana Boulevard. The project area's subsurface deposits were extensively disturbed by past land use, which likely included extensive earthmoving activity and importation of fill sediments. One profile was recorded near the Kaka‘ako Makai Zone, at the intersection of Ala Moana Boulevard and Channel Street. No culturally enriched, buried A-horizon or any burials were documented, unlike nearby HHCTCP excavations T-226A, T-226B, T-226C, T-226D, T-227, and T-227A.

Kaka‘ako Improvement District 1 (Pfeffer, Borthwick, and Hammatt 1993)

Between 1986 and 1988, CSH conducted archaeological monitoring, data recovery, and burial disinterment in the Hawai‘i Community Development Authority's Kaka‘ako Improvement District 1, which was bounded by Punchbowl Street, South Street, King Street, and Ala Moana Boulevard, and included portions of Kawaiaha‘o Lane, Queen Street, Auahi Street, Pohukaina Street, Quinn Lane, and Reed Lane. The observed stratigraphy generally consisted of imported construction fill material overlying naturally deposited Jaucas sand or volcanic cinder. In many cases, the Jaucas sand or volcanic cinder deposits were culturally enriched with pre- and post-Contact deposits including: human burials, building foundations, trash pits, midden concentrations, and various pre- and post-Contact artifacts.

A total of 149 burials were documented during the project. The burials comprised 116 historic burials from Kawaiaha‘o Cemetery (SIHP #50-80-14-4534) at Queen Street (used from 1825–1920), 31 burials from the 1853–1854 Honuakaha Smallpox Cemetery (SIHP #50-80-14-3712) at Quinn Lane, one historic burial from Punchbowl Street (SIHP #50-80-14-4532) and one possibly pre-Contact burial from Halekauwila Street (SIHP #50-80-14-4533).

The stratigraphy recorded by Pfeffer, Borthwick, and Hammatt (1993) is similar to several adjacent HHCTCP excavations (T-226A, T-226B, T-226C, T-226D, T-227, and T-227A) that each contained a culturally enriched, buried, sandy A-horizon, with two of the test excavations (T-226C and T-227A) containing human burials.

Punchbowl Street (Cordy and Hammatt 2005)

In 2005, CSH completed archaeological monitoring along Punchbowl Street for the installation of planters, improved sidewalk access, and the establishment of a north-bound contra flow lane. No historic properties were identified. Observed stratigraphy at the *makai* end of their project area revealed layers of historic and modern fill material overlying naturally Jaucas sand.

Unlike the Cordy and Hammatt (2005) excavations, nearby HHCTCP excavations T-227 and T-227A each contained a culturally enriched, buried, sandy A-horizon and T-227A contained a human burial. Another nearby HHCTCP excavation, T-227B, consisted of various modern and historic fill layers, similar to that observed in the Cordy and Hammatt (2005) study.

Honolulu Ironworks Lot (Yent 1985)

In 1985, five burials (SIHP #50-80-14-2918) were uncovered at the former Honolulu Ironworks site (Yent 1985), at the corner of Punchbowl and Pohukaina Streets. The burials were found in burial pits in a sand deposit that underlay at least a meter of fill related to the ironworks. Two of the burials were found in an extended position. The exact location of the burials is unknown.

Several adjacent HHCTCP excavations were similar to excavations described by Yent (1985). T-226A, T-226B, T-226C, T-226D, T-227, and T-227A each contained a culturally enriched, buried, sandy A-horizon, and T-226C and T-227A contained human burials (all of which are considered part of SIHP #50-80-14-2918).

Nimitz Highway Reconstructed Sewer Project (Winieski and Hammatt 2001)

In 2001, CSH conducted archaeological monitoring for the Nimitz Highway Reconstructed Sewer Project (Winieski and Hammatt 2001). The project ran along River Street, Nimitz Highway, Queen Street, South Street, and Ala Moana Boulevard. Only one historic property was encountered: a remnant of a light-gauge rail associated with the historic Honolulu Rapid Transit trolley system (SIHP #50-80-14-5942) at the intersection of Queen Street and Nimitz Highway (outside of the Kaka‘ako Makai Zone and immediately adjacent to the Downtown Waterfront Zone corridor). A historic-era brick-lined manhole was also observed at this location. A historic period soda bottle was encountered in a historic fill layer at the intersection of Pohukaina and South Streets, within the Kaka‘ako Makai Zone corridor. Sediments at this intersection consisted of fill layers down to the water table at 200 cmbs overlaying gley and the coral shelf.

Similar to the stratigraphy recorded by Winieski and Hammatt (2001), nearby HHCTCP excavation T-228 was composed entirely of fill sediments down to the water table, and T-229 was composed of several fill layers overlying natural sandy clay and gley over the coral shelf.

Federal Judiciary Building Parking Complex (Athens 1986; Leidemann 1988)

In December of 1985, monitoring was conducted for the proposed Judiciary Parking Garage, at the north corner of Pohukaina and South Streets (Athens 1986). Concentrations of historic artifacts (mainly glass bottles) designated SIHP #50-80-14-1973, were found scattered throughout several fill layers exposed in the construction trenches. The artifacts generally date to the late nineteenth to early twentieth century.

The Leidemann (1988) report provides an analysis of artifacts (designated SIHP #50-80-14-1973) collected during monitoring of construction activities at the Federal Judiciary Building Parking Complex. The archaeological monitoring was conducted by the Bernice Pauahi Bishop Museum. The project area was described in the text as on the northwest corner of Pohukaina and South Streets (Leidemann 1988:1), which would make this project area the same as Athens' 1986 study area. However, on Figure 1 from Leidemann report (1988:2), the project area was drawn on the northwest corner of Reed Lane and South Street, which would place this project area immediately north of the Athens' study area. It is believed that the figure is incorrect and that the two project areas are one and the same. Analysis of the post-Contact artifact material determined that the most likely time frame for the manufacture and disposal of the historic artifacts was between 1880 and 1930.

Adjacent HHCTCP excavation T-228 did not document any artifact concentrations.

Kamehameha Schools Kaka‘ako Mauka Parcels (O'Hare, Tulchin, Borthwick, and Hammatt 2009; Pammer, Fong and Hammatt 2011)

In 2009, CSH prepared an archaeological inventory survey plan for three Kamehameha Schools Kaka‘ako Mauka parcels and conducted limited subsurface testing within one of them (the Block 2 parking lot parcel). The Block 2 parking lot parcel, bounded by South, Halekauwila, Keawe, and Pohukaina Streets, encompasses the *makai* half of the Civic Center Transit Station. The limited subsurface testing documented various fill layers over naturally deposited wetland sediments.

In 2011, CSH completed the archaeological inventory survey for the Block 2 parking lot parcel. A total of four historic properties were identified within the project area, SIHP #50-80-14-7124, -7189, -7190, and -7197. SIHP #50-80-14-7124 consists of 31 features of historic building remnants. The features included brick and mortar clusters, slabs of concrete/basalt, concrete footings with metal supports, large slabs of very hard, melted metal, and pit features containing demolition debris. SIHP #50-80-14-7189 consists of a layer of burned historic debris, suspected to be from the open air burning of urban refuse during the early 1900s. The charred remains were utilized to fill in the unwanted wetlands around the project area. The observed cultural materials included glass bottles, ceramics, and other domestic waste. SIHP #50-80-14-7190 consisted of old salt pan remnants, presenting as an approximately 5 cm thick layer of alternating peat and clay striations. SIHP #50-80-14-7197 consisted of a sandy, buried cultural layer containing one late pre-Contact/early post-Contact fire pit feature.

Adjacent HHCTCP excavations T-229 and T-230 similarly contained salt pan remnants (part of SIHP # -7190), while T-231A, T-232, and T-232A each contained a burned historic trash layer (part of SIHP # -7189).

Kaka‘ako Improvement District 3 (Winieski and Hammatt 2000a)

Between 1990 and 1992, CSH conducted archaeological monitoring, data recovery, and burial disinterment in the Hawai‘i Community Development Authority's Kaka‘ako Improvement District 3. Subsurface excavations revealed that although the area had been previously disturbed to a great extent, a cultural layer and in situ beach sand and volcanic cinder deposits were still intact below fill layers. The cultural layer contained historic artifacts mixed with scant traditional Hawaiian cultural materials. Additionally, 20 human burials were documented. A total of 11

burials were documented in and around Mother Waldron Park (SIHP #50-80-14-5820) (adjacent to the Kaka‘ako Makai Zone) and nine burials were documented at the Pohulani Elderly Rental Housing site (SIHP #50-80-14-4380) (two blocks northwest of the Kaka‘ako Makai Zone). Seventeen of these burials were recovered and reinterred within Mother Waldron Park and three burials were preserved in place beneath the Pohulani Elderly Rental Housing facility.

Unlike the stratigraphy documented by Winieski and Hammatt (2000), nearby HHCTCP excavations T-230, T-231, and T-231A did not contain subsurface, buried A-horizons. T-230 consisted of fill layers overlying salt pan remnants (part of SIHP #50-80-14-7190) overlying natural sand and the coral shelf; T-231 consisted of all fill layers; and T-231A consisted of fill layers, including a burned historic trash layer (part of SIHP #50-80-14-7189), overlying natural sand and the coral shelf.

Mother Waldron Park (Douglas 1991)

The Douglas (1991b) report provides an analysis of a burial identified during construction activities across Mother Waldron Park. The remains were determined to be those of an adult female of Polynesian ancestry. An associated immature pig burial was believed to represent a pet. These burials are considered part of SIHP #50-80-14-4380.

East corner of Halekauwila and Cooke Streets (Dagher and Spear 2013; draft)

The Dagher and Spear (2013) report is a burial site component of a data recovery plan that documents a partial set of human skeletal remains and associated artifacts (SIHP #50-80-14-7260) that were identified during construction activities at the east corner of Halekauwila and Cooke Streets. The remains were determined to be those of a sub-adult of Native Hawaiian ancestry. Traditional Hawaiian artifacts, possible midden material, and historic artifacts were documented from the backdirt pile in which the remains were found. The human remains and all associated finds are planned for reinterment near the original location of the burial.

4.6 Modern Land Use and Built Environment

The Kaka‘ako Makai Zone traverses an urban environment through the neighborhood of Kaka‘ako. The Kaka‘ako Makai Zone corridor begins at the intersection of South Nimitz Highway and Richards Street at the northwest end, follows along South Nimitz Highway onto Ala Moana Boulevard, where it continues to Punchbowl Street, then follows Punchbowl Street to Pohukaina Street, follows Pohukaina Street to Cooke Street, then follows Cooke Street to Halekauwila Street at the southeast end. Parcels bordering the Kaka‘ako Makai Zone corridor contain commercial buildings and warehouses, high-rise condominiums, and large parking lots. A massive utility corridor is also present throughout the Kaka‘ako Makai Zone, containing electrical, gas, water, sewer, and storm lines. The number and distribution of these existing utilities indicate that this portion of the HHCTCP corridor has been heavily disturbed in the past.

4.7 Test Excavation 226 (T-226)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-029 [Plat]
Elevation Above Sea Level:	1.54 m
UTM:	617959.2437 mE / 2346029.168 mN
Max Length/Width/Depth:	6.1 m / 0.8 m / 0.8 mbs
Orientation:	55 / 235° TN
Targeted Project Component:	Utility Corridor
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 226 (T-226) was located in the center lane of Punchbowl Street, approximately 43.0 meters northeast of the Punchbowl Street and Ala Moana Boulevard intersection. A water line was located approximately 2.0 m north of T-226, and a storm drain and sewer manhole cover were located immediately to the south. T-226 was located on property owned by the City and County of Honolulu. The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Land Court Application 345 Map 1 indicated that T-226 was originally situated on land awarded to V. Kamāmalu as part of LCA 7712. S. E. Bishop’s map of the Kewalo area of Honolulu (1884) indicated that the T-226 location was originally approximately 26.0 m southeast and inland of the former shoreline and directly southeast of an unnamed road leading to the Immigrant Depot (on present-day Ala Moana Boulevard). In a map of Honolulu by Wall 1887, the unnamed road is named Kaka‘ako Street and the area of the former shoreline has become reclaimed land with proposed development, moving the shoreline to below present-day Ala Moana Boulevard. According to M. D. Monsarrat’s 1897 map of Honolulu, the location of T-226 was still an undeveloped area and along a small street intersecting with Punchbowl Street. In Newton’s 1904 map of Honolulu the small street has become an extension of Punchbowl Street and the location of T-226 was next to Honolulu Iron Works. According to a 1914 Sanborn Fire Insurance map, the location of T-226 was then within Punchbowl Street.

Previous archaeology of the surrounding area includes two primary studies. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street and South Street and from Pohukaina Street to near Ala Moana Boulevard (Yent 1985). The Department of Land and Natural Resources conducted the fieldwork and identified the burials in a sand deposit within burial pits located beneath approximately 1 m of fill. The exact location of the five burials within the study area was not recorded although the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. The northwestern boundary of the study area was located within 25 m of T-226. All five burials were assigned SIHP #50-80-14-2918 and were disinterred.

Between 1986 and 1988, CSH conducted archaeological monitoring within the Hawai‘i Community Development Authority’s Kaka‘ako Improvement District 1 (ID-1), which included Punchbowl Street and the location of T-226 (Pfeffer et al. 1993). A total of 149 burials were documented and disinterred during archaeological monitoring within Kaka‘ako Improvement District 1 from four specific burial areas; Queen Street (116 burials assigned SIHP #50-80-14-4534); South Street (31 burials assigned SIHP #50-80-14-3712); Halekauwila Street (1 burial assigned SIHP #50-80-14-4532); and Punchbowl Street (1 burial assigned SIHP #50-80-14-4533). The one burial that was identified on Punchbowl Street was located at the King Street intersection, approximately 562 m northeast of T-226. No significant archaeological findings were reported in the immediate vicinity of T-226.

Documentation Limitations: T-226 was excavated to a maximum depth of 0.80 mbs in fill material. A buried concrete layer and subsurface utility limited excavation.

Stratigraphic Summary: The stratigraphy of T-226 consisted of fill strata to the base of excavation. Observed strata included asphalt (Ia), extremely gravelly sand representing the fill from a utility trench (Ib), and previously disturbed or redeposited medium-grain sand (Ic). The stratigraphy conformed to the USDA soil survey designation of Fill land.

Artifacts Discussion: No artifacts were observed.

Feature Discussion: No features were observed.

Terrestrial Faunal Remains Collected During Excavation: No terrestrial faunal remains were collected individually during excavation.

Sample Results: No sample analysis was conducted.

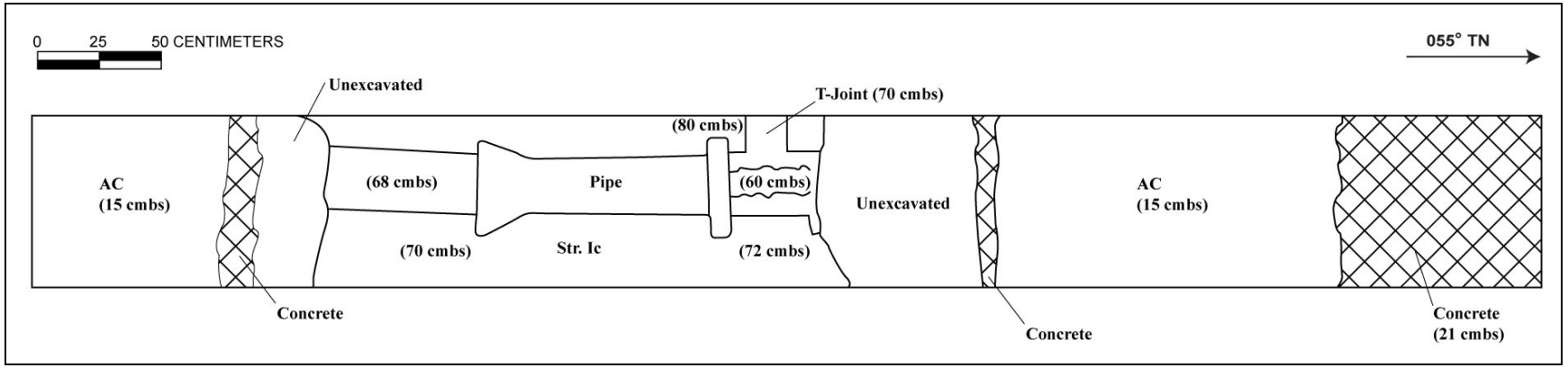
GPR Discussion: A review of amplitude slice maps indicated linear features which seem to correspond to the utilities and concrete jackets encountered during excavation. Reflectivity is relatively uniform throughout the grid and decreases with depth. A transition from higher reflectivity to lower reflectivity was observed at approximately 0.5 mbs.

GPR depth profiles for T-226 identify horizontal banding throughout the survey area which is commonly associated with stratigraphic layering. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.2 mbs. An anomaly was observed in the profile and corresponds with the large utility pipe encountered during excavation. The maximum depth of clean signal return was approximately 1.0 mbs.

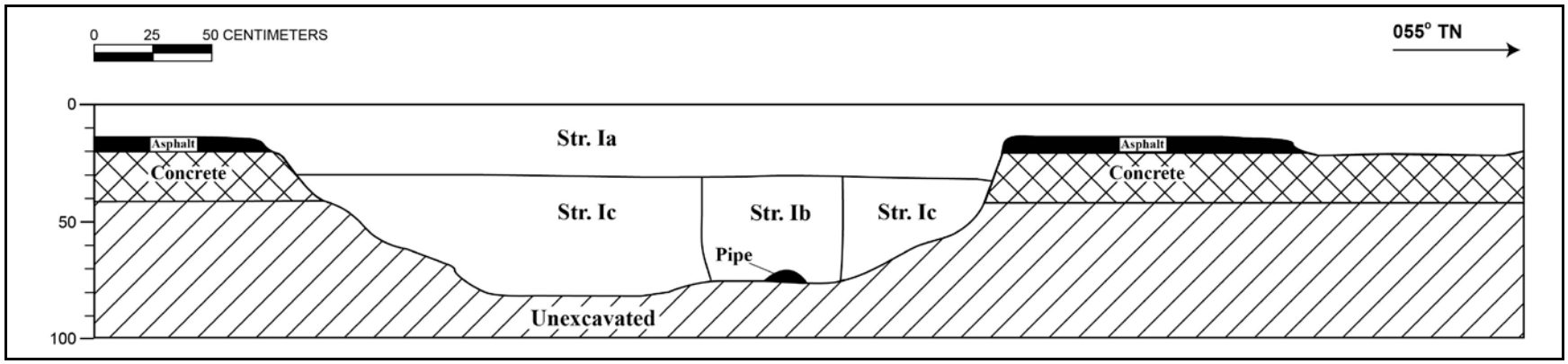
Summary: T-226 was excavated to a maximum depth of 0.80 mbs in fill material. Excavation of T-226 was limited by the presence of a subsurface utility and a buried concrete layer. The stratigraphy of T-226 consisted of fill strata (Ia-Ie) to the base of excavation. The stratigraphy conformed to the USDA soil survey designation of Fill land. No natural sediment was observed. No cultural materials were identified.

T-226 general location, view to southwest

T-226 northwest profile wall, view to west



T-226 plan view at base of excavation



T-226 northwest wall profile

T- 226 Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–30	Asphalt; road surface
Ib	30–80	Fill; 10 YR 4/1 (dark gray); extremely gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary not observed; crushed basalt gravel utility excavation fill
Ic	30–80	Fill; 10 YR 4/2 (dark grayish brown); medium-grain sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; lower boundary not visible; previously disturbed

4.8 Test Excavation 226A (T-226A)

Ahupua‘a:	Honolulu
LCA:	7712:6
TMK #:	2-1-027 [Plat]
Elevation Above Sea Level:	1.54 m
UTM:	617959.2437 mE 2356029.168 mN
Max Length/Width/Depth:	6.75m / 1.14m / 1.5 mbs
Orientation:	39 / 219° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 226A (T-226A) was located in the turn lane of Punchbowl Street onto Ala Moana Boulevard, approximately 49.6 m northeast of the intersection. Existing utilities near T-226A included a waterline located approximately 1.5 m to the northwest, a drain line located approximately 3.0 m to the southeast, and a sewer line located approximately 1.0 m to the southwest. T-226A was located on property owned by the City and County of Honolulu. T-226A was added because T-226 encountered a 12-inch waterline and could not be fully excavated. T-226A further investigated subsurface cultural deposits designated SIHP # 50-80-14-2918. The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Bishop’s 1884 Honolulu to Kewalo map indicated that T-226A was originally located approximately 31 m southeast and inland of the former shoreline. Land Court Application 345 Map 1 indicated that T-226A was originally situated on land awarded to V. Kamāmalu as part of LCA 7712. By 1914, T-226A was located within Punchbowl Street.

Previous archaeology of the surrounding area includes several studies. In 1985, excavations conducted at the former location of the Honolulu Ironworks encountered five human burials (Yent 1985). Fieldwork, which was conducted by the Department of Land and Natural Resources, identified the burials in a sand deposit within burial pits located beneath approximately 1 m of fill. All five burials were assigned SIHP #50-80-14-2918 and were disinterred. While the exact location of the five burials within the study area was not recorded, the northwestern boundary of the study area was located within 13.8 m of T-226A. Between 1986 and 1988, CSH conducted archaeological monitoring within the Hawai‘i Community Development Authority’s Kaka‘ako Improvement District 1 (ID-1), which included Punchbowl Street and the location of T-226 (Pfeffer et al. 1993). A total of 149 burials were documented and disinterred during archaeological monitoring within Kaka‘ako Improvement District 1 from four specific burial areas; Queen Street (116 burials assigned SIHP #50-80-14-4534); South Street (31 burials assigned SIHP #50-80-14-3712); Halekauwila Street (1 burial assigned SIHP #50-80-14-4532); and Punchbowl Street (1 burial assigned SIHP #50-80-14-4533). The one burial that was identified on Punchbowl Street was located at the King Street intersection, approximately 552 meters northeast of T-226A. No significant archaeological findings were reported in the immediate vicinity of T-226A.

Documentation Limitations: T-226A was excavated to the water table at 1.50 mbs. A utility pipe was encountered near the middle of the T-226A, which limited excavation. A backhoe was used to remove the upper fill strata and expose the underlying natural sediment. All of the natural sediment within T-226A was hand-excavated to the coral shelf.

Stratigraphic Summary: The stratigraphy of T-226A consisted of fill overlying the former land surface and natural sediment to the coral shelf. Observed strata included asphalt (Ia), gravel base course and utility pit fill (Ib), and locally-procured gravelly sandy loam fill (Ic) overlying a buried A-horizon (II) and natural Jaucas sand (III) grading into sandy clay (IV) and loamy clay (V) near the coral shelf. The former land surface (buried A-horizon) and associated features within T-226A have been designated components of SIHP #50-80-14-02918 (buried, historic, iron trolley or cart tracks and a buried, culturally enriched, sand A-horizon containing human skeletal remains/burials). The stratigraphy of T-226A generally conformed to the USDA soil survey designation of Fill land.

Artifacts Discussion: Two traditional Hawaiian artifacts (Acc. #226A-H-1 to H-2), comprised of one piece of volcanic glass debitage and one bone pick (used to remove the meat from gastropods), were collected.

Four (4) historic artifact fragments (Acc. #226A-A-1 to A-3) were collected, two from Stratum Ib, 0.25 mbs, and two from Stratum Ic, 0.38 mbs. One glass bottle base fragment was recovered from Stratum Ic. It is similar to soda bottles from Hawai‘i that date to the 1880s–1910s. Two brick fragments were recovered from Stratum Ib and one Prosser-ceramic button, made after 1849, was recovered from Stratum Ic. Historic artifacts collected from both layers indicated the strata likely post-date the mid-to late nineteenth century.

Features Discussion: Three features were identified within T-226A, extending from the lower boundary of the buried A-horizon (Stratum II) into underlying natural Jaucas sand (Stratum III). The buried A-horizon (II) has been designated as a component of SIHP #50-80-14-2918, which has also been identified within T-226B, T-226C, T-227, and T-227A. The three features within T-226A have been designated as Features 1–3 of SIHP #50-80-14-2918.

SIHP #50-80-14-2918 Feature 1 originated at 0.92 mbs and terminated at 1.04 mbs. Feature 1 was irregularly shaped in plan and measured more than 0.58 m long and 0.75 m wide, extending beyond the width of the excavation and beyond the south end of the excavation. A 5.5-liter bulk sediment sample was collected from Feature 1 (see Sample Results below). Feature 1 is interpreted as a pit of indeterminate function.

SIHP #50-80-14-2918 Feature 2 originated at 0.82 mbs and terminated at 0.96 mbs. Feature 2 was irregularly shaped in plan and measured 0.23 m long by more than 0.2 m wide, extending into one excavation sidewall. A 6-liter bulk sediment sample was collected from Feature 2 (see Sample Results below). Feature 2 is interpreted as a pit of indeterminate function.

SIHP #50-80-14-2918 Feature 3 originated at 0.82 mbs and terminated at 1.02 mbs. Feature 3 was irregularly shaped in plan and measured 0.43 m long by more than 0.75 m wide, extending beyond the width of the excavation. A 5-liter bulk sediment sample was collected from Feature 3 (see Sample Results below). Feature 3 is interpreted as a pit of indeterminate function.

Terrestrial Faunal Remains Collected During Excavation: Faunal remains were collected individually during excavation from the interface of Stratum Ib/Ic (0.4–0.64 mbs), the interface

of Stratum Ic/II (0.7 mbs), Stratum II (0.97–1 mbs), Stratum III (0.75–1.27 mbs), and Stratum IV (1.12–1.36 mbs). Faunal remains from the interface of Stratum Ib/Ic (0.4–0.64 mbs) consisted of an unmodified *Canis lupus familiaris* distal metacarpus fragment, and *Bos taurus* skeletal elements, some of which had been butchered by a metal saw blade (indicating an historic origin). In addition to the mammalian remains recovered, there were also Osteidhyes (fish) fragments recovered from the Ib/Ic interface.

Faunal remains from the interface of Stratum Ic/II (0.7 mbs) consisted of unmodified *Bos taurus*, *Sus scrofa*, small and medium mammal skeletal elements. The presence of *Bos taurus* (an introduced species) indicated a post-Contact origin for this sample area.

Diaphysis sections from a *Rattus* sp. and an unidentified medium mammal were recovered from Stratum II, (a culturally-enriched A-horizon) within Feature 3 (0.97–1 mbs) of SIHP #50-80-14-02918. None of these bones showed any evidence of cultural modification.

A collection of *Sus scrofa* skeletal elements was recovered from Stratum III (0.75–1.27 mbs), none of which showed any evidence of cultural modification, and *Sus scrofa* is a Polynesian introduction common in both pre- and post-Contact contexts. Finally, a single unmodified medium mammal diaphysis fragment was collected from Stratum IV (1.12–1.36 mbs).

Sample Results: Sampling methodology for T-226A included the collection of a large screened sample and numerous bulk sediment samples from the buried A-horizon (II) and associated features.

A 34-liter sample of Stratum II (0.6–0.97 mbs) was screened on site during the excavation of T-226A, and the contents of the sample were collected. The screened sample contained charcoal (10.0 g), marine shell midden (48.3 g, see Marine Shell Midden Table located at the end of Section 3.8), naturally-occurring marine shell (3.4 g), a dog (*Canus lupus familiaris*) premolar (0.3 g), a shark tooth (0.1 g), an unidentified fish bone (0.4 g), an unidentified medium mammal fragment (0.7 g), and an unidentified small mammal fragment (0.1 g).

The charcoal (10.0 g) collected from the screened sample was submitted for wood taxa identification. The analysis identified a variety of native, Polynesian-introduced, and historically-introduced taxa (see Stratum II Wood Taxa Identification Table located at the end of Section 3.8).

Bulk sediment samples were collected from Stratum II at 0.7–0.75 mbs (6 L) and 0.8–0.91 mbs (6 L). Bulk sediment samples were also collected from Feature 1 (5.5 L) at 0.92–1.04 mbs, Feature 2 (6 L) at 0.82–0.96 mbs, and Feature 3 (5 L) at 0.82-1.02 mbs. All bulk sediment samples were wet-screened.

The bulk sample collected from Stratum II (0.7–0.75 mbs) contained charcoal (2.2 g), marine shell midden (38.7 g, see Marine Shell Midden Table located at the end of Section 3.8), naturally-occurring marine shell (4.8 g), a green bottle glass fragment (0.2 g), an unidentified fish bone fragment (0.3 g), a small mammal bone consistent with cf. *Rattus* sp. (0.1 g), and an unidentified medium mammal bone (0.1 g).

The bulk sample collected from Stratum II at (0.8–0.91 mbs) contained charcoal (10.9 g), marine shell midden (22.5 g, see Marine Shell Midden Table located at the end of Section 3.8), naturally-occurring marine shell (4.4 g), unidentified rusted metal fragments (6.2 g), a pig (*Sus*

scrofa) molar fragment (6.2 g), an unidentified fish bone (0.5 g), unidentified medium mammal bone fragments (0.9 g), and a basalt fragment (23.6 g).

The bulk sample collected from Feature 1 contained charcoal (5.0 g), marine shell midden (24.9 g, see Marine Shell Midden Table located at the end of Section 3.8), naturally-occurring marine shell (1.3 g), unidentified medium mammal bone fragments (1.3 g), and an unidentified burned fish bone (0.1 g).

The charcoal (5.0 g) that was collected from Feature 1 was submitted for wood taxa identification. The analysis identified native and Polynesian-introduced taxa (see see Wood Taxa Identification Table located at the end of Section 3.8).

The bulk sample collected from Feature 2 contained charcoal (2.9 g), marine shell midden (16.1 g, see Marine Shell Midden Table located at the end of Section 3.8), naturally-occurring marine shell (0.8 g), a rusted nail (4.8 g), a white ceramic fragment (0.5 g), an unidentified medium mammal bone fragment (0.8 g), an unidentified fish bone (0.2 g), and a pig (*Sus scrofa*) molar fragment.

The charcoal (2.9 g) that was collected from Feature 2 was submitted for wood taxa identification. The analysis identified native, Polynesian-introduced, and historically-introduced taxa (see Wood Taxa Identification Table located at the end of Section 3.8).

The bulk sample collected from Feature 3 contained charcoal (13.3 g), marine shell midden (31.6 g, see Marine Shell Midden Table located at the end of Section 3.8), naturally-occurring marine shell (0.2 g), a carbonized *kukui* nut shell (2.7 g), a piece of volcanic glass (0.1 g), an unidentified fish bone (0.1 g), and an unidentified medium mammal bone fragment (0.1 g).

The charcoal (13.3 g) that was collected from Feature 3 was submitted for wood taxa identification. The analysis identified native and Polynesian-introduced taxa (see Wood Taxa Identification Table located at the end of Section 3.8).

Sample analysis included the identification of material that was collected from screened and bulk sediment samples from the buried A-horizon (II) within T-226A, and the identification of wood taxa represented by collected charcoal samples.

The buried A-horizon appears to have been disturbed during post-Contact use of the area as evidenced by the presence of historic artifacts and historically-introduced wood taxa within collected samples. Feature 2, which also contained historic artifacts and historically-introduced wood taxa, is considered to be an historic (post-Contact) deposit.

The buried A-horizon (II) also contains an abundance of marine shell midden along with a small amount of fish and mammal bone, and a piece of volcanic glass. The food refuse, including the shell midden and faunal bone, and the piece of volcanic glass may be indicative of pre- and/or early post-Contact traditional utilization of the former land surface (II). The absence of historic artifacts and historically-introduced taxa within Feature 1 and Feature 3 may indicate that these features were deposited prior to European Contact.

Volcanic glass from Stratum II at 0.97–1.0 mbs was sent for EDXRF analysis. Specific source information is not available; however, the volcanic glass sample clearly does not match sources from Hawai‘i Island. The sample was from “Group 1,” one of two distinct geochemical groups

identified from the 35 City Center AIS EDXRF volcanic glass samples, likely representing different volcanic sources on O‘ahu (see EDXRF discussion in Volume V).

The results of sample analysis indicated that the majority of the former land surface deposit (II) within T-226A was utilized or disturbed during the post-Contact era. The presence of food refuse and one piece of volcanic glass may be evidence of pre- and/or early post-Contact traditional utilization of the former land surface (II). The absence of historic artifacts and historically-introduced taxa within Feature 1 and Feature 3 may indicate that the deepest deposits within the former land surface were undisturbed during the post-Contact era.

GPR Discussion: A review of amplitude slice maps indicated a linear feature that runs parallel to the excavation and could correspond to the utility jacket encountered during excavation. Reflectivity is relatively uniform throughout the grid and decreases with depth. A transition from higher reflectivity to lower reflectivity is observed at approximately 0.5 mbs.

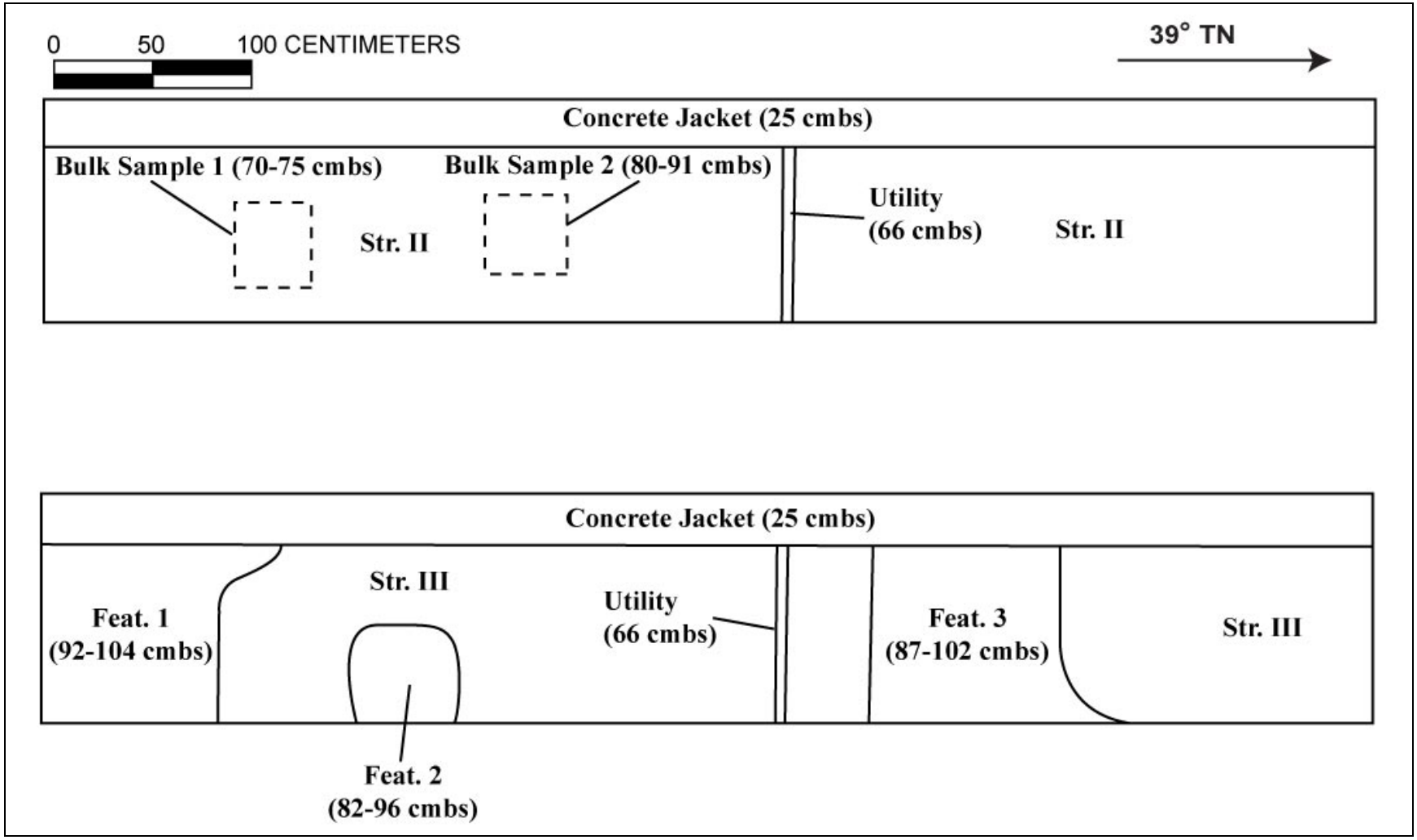
GPR depth profiles for Excavation 226A identify horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.2 mbs. Several anomalies are observed in the profile; one corresponds to the utility pipe encountered during excavation, and the others are not within the excavation boundaries. The maximum depth of clean signal return was approximately 0.9 mbs.

Summary: T-226A was excavated to the water table at 1.50 mbs. The stratigraphy of T-226A consisted of fill (Ia–Ic) overlying the former land surface (II) and natural sediment (IV and V) to the coral shelf. The stratigraphy of T-226A generally conformed to the USDA soil survey designation of Fill land (FL). Historic artifacts collected from Stratum Ib and Stratum Ic indicated the strata may post-date the mid-to late nineteenth century. A total of three features were identified within T-226A, extending from the lower boundary of the buried A-horizon (Stratum II) into underlying natural Jaucas sand (Stratum III). The three features within T-226A have been designated as Features 1–3 of SIHP #50-80-14-2918 (buried, historic, iron trolley or cart tracks and a buried, culturally enriched, sand A-horizon containing human skeletal remains/burials). Sampling methodology for T-226A included the collection of a large screened sample and numerous bulk sediment samples from the buried A-horizon (II) and associated features. The results of sample analysis indicated that the majority of the former land surface deposit (II) within T-226A was utilized or disturbed during the post-Contact era. The presence of food refuse and one piece of volcanic glass may be evidence of pre- and/or early post-Contact traditional utilization of the former land surface (II). The absence of historic artifacts and historically-introduced taxa within Feature 1 and Feature 3 indicated that the deepest deposits within the former land surface were undisturbed during the post-Contact era. SIHP #50-80-14-2918 has also been identified within T-226B, T-226C, T-227, and T-227A (see Volume I for a full description of this cultural resource).

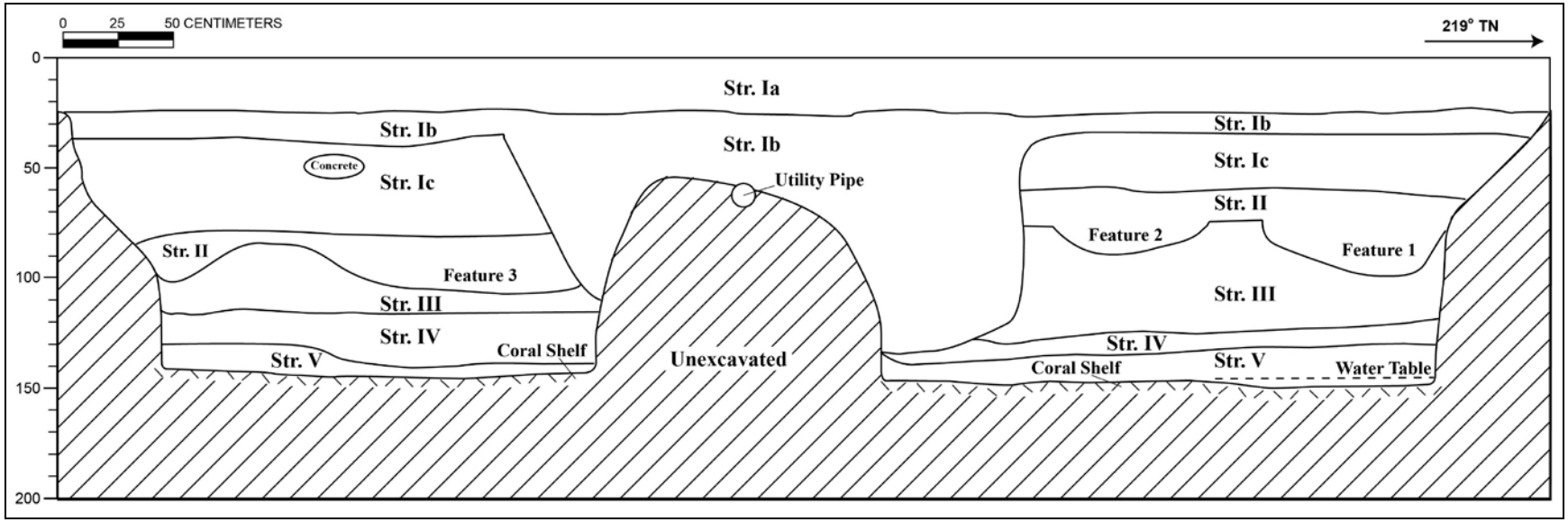
T-226A general location (view to southwest)

T-226A southwest wall profile, view to south

T-226A excavation floor showing Feature 1 and Feature 2



T-226A plan view showing the upper boundary of Stratum II (top) and the Stratum II/III interface (bottom)



T-226A southwest wall profile showing SIHP #50-80-14-2918 Features 1-3

T-226A Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–25	Asphalt
Ib	25–135	Fill; 10 YR 2/2 (very dark brown); very gravelly loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; gravel base course and utility pit fill
Ic	28–85	Fill; 10 YR 3/2 (dark grayish brown); gravelly sandy loam; weak, fine, crumb, structure; moist, very friable consistency; non-plastic; mixed origin; diffuse, smooth lower boundary; locally-procured fill
II	58–106	Natural, A-horizon; 10 YR 4/3 (brown); medium-grain loamy sand; structureless, single-grain; moist, very friable consistency; non-plastic; mixed origin; diffuse, smooth lower boundary; a component of SIHP # -2918
III	85–130	Natural; 10 YR 6/4 (light yellowish brown); medium to coarse grain sand; structureless, single-grain; moist, very friable consistency; non-plastic; marine origin; diffuse, smooth lower boundary; Jaucas sand
IV	115–140	Natural; 10 YR 8/2 (very pale brown); sandy clay; weak, fine, blocky structure; moist, friable consistency; non-plastic; marine origin; clear to diffuse, smooth lower boundary
V	130–150	Natural; GLEY 1 5/10 GY (greenish gray); loamy clay weak, fine, blocky structure; moist, friable to firm consistency; non-plastic; marine origin; lower boundary not visible

T-226A Faunal Analysis Table

Acc. #	Stratum	Depth(cmbs)	Feature	Family/Class	Species	Element	Description	Modification
226A-F-1	Ib/Ic	40–64	-	Bovidae (cow)	*Bos taurus*	Ribs; Diaphysis section	Fragments	Ribs butchered (with metal blade)
226A-F-2	Ib/Ic	40–64	-	Canidae (dog)	*Canis lupus familiaris*	Metacarpus (distal portion)	Fragments	None
226A-F-3	Ic/IIa	40	-	Bovidae (cow)	*Bos taurus*	Rib (pieces mend)	Fragments	None
226A-F-4	Ic/IIa	40	-	Suidae (pig)	*Sus scrofa*	Femur (proximal portion) (Juvenile); Incisor tooth; Vertebra (spinous process)	Fragments	None
226A-F-5	Ic/IIa	40	-	Mammalia	Medium mammal	Diaphysis section; Cranial; Irregular bone	Fragments	None
226A-F-6	Ic/IIa	40	-	Mammalia	Small mammal	Femur diaphysis section (distal portion)	Fragment	None
226A-F-7	IIa	70–75	-	Mammalia	Medium mammal	Diaphysis sections (possible)	Fragments	None

T-226A Stratum II Screened Sample (34.0 L) Marine Shell Midden

Exc. #	Stratum	Depth (mbs)	Weight (g)	Midden Type
226A	II	0.60–0.97	15.3	Neritidae *Nerita picea*
			11.0	Mytilidae *Brachidontes crebristriatus*
			6.9	Shell (burned)
			6.8	Tellinidae *Tellina* spp.
			2.5	Strombidae *Strombus* sp.
			1.6	Cypraeidae *Cypraea caputserpentis*
			1.5	Trochidae *Trochus* sp.
			1.1	Turbinidae *Turbo sandwicensis*
			0.8	Echinodermata *diadema* sp./*mathaei* sp.
			0.3	Crustacean
			0.1	Isognomidae *Isognomon* sp.

T-226A Stratum II Screened Sample (34.0 L) Wood Taxa Identification

City Center Section: Trench T-226A; Punchbowl Street, *mauka* of intersection with Ala Moana Boulevard							
Sample 15: 60-97 cmbs, Stratum IIa	1302-90	Conifer	Pine, fir, etc.	Historic Introduction/Tree	Wood	1	0.22
	1302-91	Not identified			Bark	2	0.48
	1302-92	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	1	0.08
	1302-93	cf. *Dodonaea viscosa*	*ʻAʻaliʻi*	Native/Shrub	Wood	15	0.67
	1302-94	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	14	1.19
	1302-95	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	4	0.29
	1302-96	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	3	0.17
	1302-97	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions/ Shrub-Tree	Wood	3	0.13
	1302-98	cf. *Sida fallax*	*ʻIlima*	Native/Shrub	Wood	6	0.35
	1302-99	Unknown 8			Wood	2	0.15
	1302-100	cf. Temperate hardwood			Wood	3	0.10
	1302-101	cf. *Myoporum sandwicensis*	*Naio*	Native/Tree	Wood		0.12
	1302-102	cf. *Metrosideros polymorpha*	*ʻŌhiʻa lehua*	Native/Tree	Wood	6	0.33
	1302-103	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/Tree	Nutshell	1	0.15
	1302-104	cf. *Syzygium* sp.	Mountain apple, roseapple, Java plum, *ʻōhiʻa ai*	Native + Historic Introductions/Tree	Wood	1	0.06

T-226A Stratum II (0.7–0.75 mbs) Marine Shell Midden

Exc. #	Stratum	Depth (mbs)	Weight (g)	Midden Type
T-226A	II	0.70–0.75	9.4	Mytilidae *Brachidontes crebristriatus*
			8.4	Neritidae *Nerita picea*
			3.8	Conidae *Conus* sp.
			3.6	Tellinidae *Tellina palatam*
			1.4	Gastropod fragments, (1) burned
			0.5	Nassariidae
			1.4	Nassariidae *Nassarius hirtus*
			1.9	Strombidae *Strombus* sp.
			1.7	Echinodermata: *diadema* sp./*mathaei* sp., *Heterocentrotus mammillatus*
			0.8	Pyramidellidae *Pyramidella dolabrata*
			0.9	Trochidae *Trochus* sp.
			0.8	Trochidae *Trochus* spp.
			0.6	Isognomidae *Isognomon* sp.
			0.4	Neritidae *Nerita polita*
			0.3	Crustaceans
			0.2	Crustacean (burned)
			0.1	Pteriidae *Pinctada radiata*
			2.2	Shell fragments (burned)
			0.3	Turbinidae *Turbo* sp., operculum

T-226A Stratum II (0.8–0.91 mbs) Marine Shell Midden

Exc. #	Stratum	Depth (mbs)	Weight (g)	Midden Type
T-226A	II	0.80–0.91	7.1	Mytilidae *Brachidontes crebristriatus*
			6.4	Neritidae *Nerita picea*
			1.5	Shell (burned)
			1.2	Trochidae *Trochus* sp.
			1.1	Tellinidae *Tellina* spp.
			1.4	Tellinidae *Tellina palatam*
			0.9	Crustacean
			1.0	*Crustacean* (burned)
			0.4	Cymatiidae *Cymatium* sp.
			0.3	Isognomidae *Isognomon* sp.
			0.2	Cypraeidae
			0.7	Echinodermata *diadema* sp./*mathaei* sp.
			0.3	Strombidae *Strombus* sp. (burned)

T-226A Feature 1 Marine Shell Midden

Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226A	1	0.92–1.04	7.5	Neritidae *Nerita picea*
			4.0	Burned shell
			3.7	Mytilidae *Brachidontes crebristriatus*
			1.6	Tellinidae *Tellina palatam*
			4.6	Strombidae *Strombus sp.*
			0.7	Cypraeidae *Cypraea caputserpentis*
			0.8	Echinodermata *diadema sp./ mathaei sp.*
			0.6	Isognomidae *Isognomon sp.*
			0.7	Turbinidae *Turbo sandwicensis*
			0.3	Crustacean
			0.1	Cymatiidae
			0.3	Trochidae *Trochus sp.*

T-226A Feature 1 and Feature 2 Wood Taxa Identification

Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight, g
Sample 16: Feature 1, 98-103 cmbs, Stratum IIa	1302-114	Cf. Temperate hardwood			Wood	5	0.24
	1302-115	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions/ Shrub-Tree	Wood	2	0.05
	1302-116	cf. *Sida fallax*	*ʻIlima*	Native/Shrub	Wood	24	0.68
	1302-117	cf. *Psychotria* sp.	*Kōpiko*	Native/Tree	Wood	3	0.15
	1302-118	Unknown 9			Wood	2	0.05
	1302-119	cf. *Metrosideros polymorpha*	*ʻŌhiʻa lehua*	Native/Tree	Wood	6	0.14
	1302-120	cf. *Lagenaria siceraria*	*Ipu*	Polynesian Introduction/Vine	Fruit rind	1	0.04
	1302-121	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	1	0.02
	1302-122	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	6	0.28
	1302-123	Unknown 8			Wood	2	0.02
	1302-124	*Chenopodium oahuense*	*ʻĀheahea, ʻāweoweo*	Native/Shrub	Wood	1	<0.01
	1302-125	*Pandanus tectorus*	*Hala*	Native/Tree	Fruit key	1	0.02
	1302-126	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	6	0.11
Sample 17: Feature 2, 82-88 cmbs, Stratum IIa	1302-105	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	14	0.43
	1302-106	*Cocos nucifera*	*Niu*, coconut	Polynesian Introduction/Tree	Nutshell	4	0.12
	1302-107	Not identified			Bark	4	0.06
	1302-108	cf. *Metrosideros polymorpha*	*ʻŌhiʻa lehua*	Native/Tree	Wood	6	0.10
	1302-109	*Hibiscus tiliaceus*	*Hau*	Native/Shrub-Tree	Wood	3	0.04
	1302-110	cf. *Artocarpus altilis*	*Ulu*	Polynesian Introduction/Tree	Wood	1	0.02
	1302-111	*Styphelia tameiameae*	*Pūkiawe*	Native/Shrub	Wood	1	0.02
	1302-112	*Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	1	0.01
	1302-113	Conifer	Pine, fir, etc.	Historic Introduction/Tree	Wood	2	0.01

T-226A Feature 2 Marine Shell Midden

Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226A	2	0.82–0.96	4.7	Trochidae
			3.9	Trochidae *Trochus sp.*
			3.7	Neritidae *Nerita picea*
			3.7	Mytilidae *Brachidontes crebristriatus*
			1.4	Conidae
			0.3	Naticidae
			0.2	Crustacean
			0.4	Echinodermata *diadema sp./ mathaei sp.*
			0.1	Tellinidae
			0.5	Tellinidae *Tellina palatam*
			0.1	Tellinidae *Tellina spp.*
			3.2	Cymatiidae *Cymatium* sp.
			1.4	Nassariidae *Nassarius hirtus*
			1.1	Shell matrix (burned)
			0.6	Turbinidae *Turbo sandwicensis*

T-226A Feature 3 Marine Shell Midden

Exc. #	SIHP #	Stratum	Feature	Depth (mbs)	Weight (g)	Midden Type
226A		IIa	3	0.97–1.00	9.5	Mytilidae *Brachidontes crebristriatus*
					5.3	Burned shell
					4.5	Conidae *Conus sp.*
					2.5	Neritidae *Nerita picea*
					2.5	Tellinidae *Tellina sp.*
					2.2	Strombidae *Strombus sp.*
					1.9	Cymatiidae *Cymatium sp.*
					1.8	Trochidae *Trochus sp.*
					1.0	Cypraeidae *Cypraea caputserpentis*
					0.2	Isognomidae *Isognomon sp.*
					0.1	Burned crustacean
					0.1	Echinodermata *mathaei sp.*

T-226A Feature 3 Wood Taxa Identification

WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight, g
1302-127	cf. *Psychotria* sp.	*Kōpiko*	Native/Tree	Wood	4	0.29
1302-128	*Aleurites moluccana*	*Kukui*	Polynesian Introduction/Tree	Nutshell	113	5.69
1302-129	cf. *Cordyline terminalis*	*Kī*, ti	Polynesian Introduction/Shrub	Stem	8	0.51
1302-130	cf. *Chamaesyce* sp.	*Akoko*	Native/Shrub	Wood	30	1.24
1302-131, 143	cf. Temperate hardwood.			Wood	2	0.18
1302-132	cf. *Metrosideros polymorpha*	*‘Ōhi‘a lehua*	Native/Tree	Wood	2	0.08
1302-133	*Chenopodium oahuense*	*‘Āheahea, ‘āweoweo*	Native/Shrub	Wood	5	0.06
1302-134	cf. *Artocarpus altilis*	*Ulu*	Polynesian Introduction/Tree	Wood	2	0.04
1302-135	cf. *Osteomeles anthyllidifolia*	*‘Ūlei*	Native/Shrub	Wood	3	0.04
1302-136	cf. *Sida fallax*	*‘Ilima*	Native/Shrub	Wood	7	0.19
1302-137	Not identified			cf. tuber	2	0.04
1302-138	*Diospyros sandwicensis*	*Lama*	Native/Tree	Wood	2	0.04
1302-139	Not identified			Bark	12	0.29
1302-140	Poaceae	Grass		Stem	1	0.03
1302-141	cf. *Senna* sp.	*Kolomona*	Native+Historic Introductions	Wood	6	0.14
1302-142	cf. *Lagenaria siceraria*	*Ipu*	Polynesian Introduction/Vine	Fruit rind	1	0.03
1302-144	Unknown 8			Wood	3	0.05
1302-145	Unknown 10			Wood	4	0.04

4.9 Test Excavation 226B (T-226B)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-027 [Plat]
Elevation Above Sea Level:	1.35 m
UTM:	617936.0776 mE 2356012.054 mN
Max Length/ Width/ Depth:	6.55 m/ 0.7 5 m/ 1.48 mbs
Orientation:	80 / 260° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 226B (T-226B) was located in the westbound turn lane of Punchbowl Street onto Ala Moana Boulevard, approximately 19.5 m northeast of the intersection. A water line was located 2.8 m southeast of the excavation area. T-226B was located on property owned by the City and County of Honolulu. T-226B was added to increase testing coverage area due to utility relocation and to further investigate subsurface cultural deposits designated SIHP # 50-80-14-2918. The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Land Court Application 345 Map 1 indicated that T-226B was originally situated on land awarded to V. Kamāmalu as part of LCA 7712. S. E. Bishop’s map of the Kewalo area of Honolulu (1884) indicated that T-226B was originally located approximately 15 m southeast and inland of the former shoreline within an unnamed road leading to the shore and the Immigrant Depot (on present-day Ala Moana Boulevard). According to the map, the west end of the excavation area cuts into an unnamed previous structure. In a map of Honolulu by W. A. Wall (1887), the unnamed road is named Kaka‘ako Street and the area of the former shoreline to the north has become reclaimed land with proposed development. In Newton’s 1904 map of Honolulu the small street has become an extension of Punchbowl Street and the location of T-227 was next to Honolulu Iron Works. A 1914 Sanborn Fire Insurance map identified the western end T-226B as within a “Boat Building.” A review of historic maps and aerial photographs indicated that the addition of the westbound turn lanes on Punchbowl Street to Ala Moana Boulevard at the location of T-226B did not occur prior to the 1970s.

Previous archaeology of the immediate vicinity of T-226B includes three studies. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street and South Street and from Pohukaina Street to near Ala Moana Boulevard (Yent 1985). The Department of Land and Natural Resources conducted the fieldwork and identified the burials in a sand deposit within burial pits located beneath approximately 1 m of fill. The exact location of the five burials within the study area was not recorded, although the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. All five burials were assigned SIHP #50-80-14-2918 and were disinterred.

Between 1986 and 1988, CSH conducted archaeological monitoring within the Hawai‘i Community Development Authority’s Kaka‘ako Improvement District 1 (ID-1), which included Punchbowl Street, Ala Moana Boulevard, and the location of T-226D (Pfeffer et al. 1993). A total of 149 burials were documented and disinterred during archaeological monitoring within Kaka‘ako Improvement District 1 from four specific burial areas, consisting of two cemeteries and two isolated burials: Queen Street (116 burials assigned SIHP #50-80-14-4534); South Street (31 burials assigned SIHP #50-80-14-3712); Halekauwila Street (1 burial assigned SIHP #50-80-14-4532); and Punchbowl Street (1 burial assigned SIHP #50-80-14-4533). The one burial that was identified on Punchbowl Street was located at the King Street intersection.

In 2007, CSH conducted archaeological monitoring along Ala Moana Boulevard and Nimitz Highway from Fort Street Mall and Pi‘ikoi Street for resurfacing and subsurface utility installations (Petry et al. 2009). Most of the construction required excavations less than 0.6 mbs, except for traffic signals that reached depths of 2.0 mbs. No historic properties were documented during archaeological monitoring of the project.

Documentation Limitations: T-226B was excavated to the coral shelf at a depth of 1.48 mbs and beneath the water table, which was present at 1.36 mbs. There were no specific factors that limited documentation of T-226B. A backhoe was used to remove the upper fill strata and expose the underlying natural sediment. All of the natural sediment within T-226B was hand-excavated to the coral shelf.

Stratigraphic Summary: The stratigraphy of T-226B consisted of fill overlying the former land surface and natural sediment to the coral shelf. Observed strata included asphalt (Ia) and crushed coral base course (Ib) overlying a buried A-horizon (II), natural Jaucas sand (III), and marine sandy clay (IV) above the coral shelf (V). The former land surface (buried A-horizon) and associated features within T-226B have been designated components of SIHP #50-80-14-2918 (buried, historic, iron trolley or cart tracks and a buried, culturally enriched, sand A-horizon containing human skeletal remains/burials). The stratigraphy of T-226B did not conform to the USDA soil survey designation of Fill land.

Artifacts Discussion: Ten (10) historic artifacts (Acc. #226B-A-1 to A-5) were collected during hand excavation of the buried A-horizon (Stratum II) within T-226B. The artifacts consist of five ceramic Anglo/American flatware earthenware fragments from one vessel (Acc. #226B-A-1, see following photographs), two ceramic stoneware bottle body fragments from one bottle (Acc. #226B-A-2, see following photographs), two small glass fragments of two bottles (Acc. #226B-A-3 to A-4), and one red brick fragment (Acc. #226B-A-5). There were no attributes that could provide a narrow manufacturing date range.

Features Discussion: A total of eight pit features (Features 4-11) were documented within T-226B originating from the buried A-horizon (Stratum II) into underlying natural Jaucas sand (Stratum III). The buried A-horizon (II) has been designated as a component of SIHP #50-80-14-2918, which has also been identified within T-226A, T-226C, T-226D, T-227, and T-227A. The eight features within T-226B have been designated as Features 4-11 of SIHP #50-80-14-2918. SIHP #50-80-14-2918 Features 1-3 were identified within T-226A.

SIHP #50-80-14 -2918 Feature 4 originated at 0.70 m below surface and terminated at 0.96 m below surface. Feature 4 was irregularly shaped in plan and measured 0.52 m long by more than

0.75 m wide, extending beyond the width of the excavation. A 19-liter screened sample and one bulk sample were collected from Feature 4 (see Sample Results below). Feature 4 is interpreted as a possible pit of indeterminate function.

SIHP #50-80-14-2918 Feature 5 originated at 0.75 m below surface and terminated at 0.95 m below surface. Feature 5 was oval-shaped in plan and measured 0.35 m long by 0.24 m wide. A 9.5-liter screened sample and one bulk sample were collected from Feature 5 (see Sample Results below). Feature 5 is interpreted as a pit of indeterminate function.

SIHP #50-80-14-2918 Feature 6 originated at 0.80 m below surface and terminated at 1.10 m below surface. Feature 6 was irregularly shaped in plan and measured 1.23 m long by more than 0.75 m wide, extending beyond the width of the excavation. A 19-liter screened sample, one bulk sample, and one charcoal sample were collected from Feature 6 (see Sample Results below). Feature 6 is interpreted as a pit of indeterminate function.

SIHP #50-80-14-2918 Feature 7 originated at 0.80 m below surface and terminated at 0.95 m below surface. Feature 7 was circular-shaped in plan, located within the central portion of Feature 6, and measured 0.27 m long by 0.28 m wide. One bulk sediment sample was collected from Feature 7 (see Sample Results below). Feature 7 is interpreted as a pit of indeterminate function.

SIHP #50-80-14-2918 Feature 8 originated at 0.76 m below surface and terminated at 0.90 m below surface. Feature 8 was irregularly shaped in plan and measured 1.09 m long by more than 0.75 m wide, extending beyond the width of the excavation. A 19-liter screened sample, one bulk sample, one charcoal sample, and one possible fire-cracked rock fragment were collected from Feature 8 (see Sample Results below). Feature 8 is interpreted as a pit of indeterminate function.

SIHP #50-80-14-2918 Feature 9 originated at 0.76 m below surface and terminated at 0.85 m below surface. Feature 9 was circular-shaped in plan and measured 0.16 m long by 0.13 m wide. One bulk sediment sample was collected from Feature 9 (see Sample Results below). Feature 9 is interpreted at a pit of indeterminate function.

SIHP #50-80-14-2918 Feature 10 originated at 0.75 m below surface and terminated at 0.87 m below surface. Feature 10 was irregularly shaped in plan and measured 0.43 m long by more than 0.30 m wide, extending into one excavation sidewall. One bulk sediment sample was collected from Feature 10 (see Sample Results below). Feature 10 is interpreted as a pit of indeterminate function.

SIHP #50-80-14-2918 Feature 11 originated at 0.78 mbs and terminated at 0.94 mbs Feature 11 was irregularly shaped and measured 1.02 m long by more than 0.75 m wide, extending beyond the width of the excavation. A 19-liter screened sample, one bulk sample, and faunal remains were collected from Feature 11 (see Sample Results below). Feature 11 is interpreted as a pit containing a Canidae (dog) burial.

Terrestrial Faunal Remains Collected During Excavation: Faunal remains were collected individually during excavation from two depths within Stratum II (0.53-0.76 and 0.9 mbs) which is a culturally enriched A-horizon and a component of SIHP #50-80-14-2918. Faunal remains from the 0.53-0.76 mbs collection consisted of *Bos taurus* and *Sus scrofa* skeletal elements. The *Bos taurus* fragments had been butchered with a metal saw blade, indicating an historic origin, not traditional Hawaiian.

Faunal remains from 0.9 mbs consisted of an articulated *Canis lupus familiaris* (small dog) found within Feature 11 of SIHP# 50-80-14-02918. *Canis lupus familiaris* is a Polynesian introduction common in both pre- and post-Contact contexts.

Sample Results: A total of 26 samples were collected from the buried A-horizon (Stratum II) and associated features (Features 4-11) within T-226B.

Samples collected from the buried A-horizon (Stratum II) consisted of two bulk samples (collected from 0.60–0.65 mbs and 0.73–0.76 mbs, totaling 9 L) and various hand-selected items that were collected from the stratum (either during hand-shovel excavation or from the spoils pile), including faunal bone, historic artifacts, fire-cracked rock, basalt stones, and marine shell midden. [For discussion of the historic artifacts and faunal remains collected see the above sections]. The bulk sample collected nearest the upper boundary of Stratum II (between 0.60–0.65 mbs) contained historic artifacts (ceramic, metal, brick and glass fragments) (2.5 g), fire-cracked rock (71.2 g), fish bone (0.4 g), medium mammal remains (0.8 g), a water-rounded pebble (5.3 g), charcoal (0.4 g), non-midden marine shell (0.3), and marine shell midden (14.9 g, see Marine Shell Midden Table located at end of Section 3.9). The bulk sample collected from a slightly deeper depth within Stratum II (0.73–0.76 mbs) lacked the historic artifacts seen in the higher bulk sample, indicating less, or perhaps a lack of, historic disturbance to this lower level of the buried A-horizon. The bulk sample contained charcoal (1.2 g), burned *kukui* nut shell (0.1 g), volcanic glass (0.1 g), small mammal remains (0.1 g), burned small mammal remains (0.2 g), and marine shell midden (25.4 g) (see Marine Shell Midden Table located at end of Section 3.9). An additional 112.4 g of marine shell midden was collected by hand from the general buried A-horizon.

Samples collected from Feature 4 consisted of a 4.5 L bulk sample at 0.81–0.87 mbs and a 5-gallon screened sample at 0.87–0.96 mbs. Material collected from Feature 4 contained charcoal (2.3 g), fish bone (0.1 g), a shark tooth (0.1 g), a *Rattus sp.* (rat) tooth (0.1 g), fire-cracked rock (10.8 g), naturally-occurring water-rounded marine shell (2.7 g), and marine shell midden (17.0 g, see Marine Shell Midden Table located at of Section 3.9 below). Charcoal from Feature 4 (2.3 g) was submitted for wood taxa identification. Wood taxa identification results included *‘Ōhi‘a lehua (*cf. *Metrosideros polymorpha)*, *‘Āheahea (Chenopodium oahuense)*, *Kukui (Aleurites moluccana)* wood and nutshell, *Ulu (*cf. *Artocarpus altilis)* (breadfruit), and *Pilo* (cf. *Coprosma* sp.). All of the identified wood taxa were considered to be native or Polynesian-introduced trees or shrubs (see Wood Taxa Identification located at the end of Section 3.9).

Samples collected from Feature 5 consisted of a 2 L bulk sample at 0.80-0.90 mbs and a 2.5-gallon screened sample at 0.90–0.95 mbs. Material collected from Feature 5 contained charcoal (0.4 g), volcanic glass (0.1 g), *Rattus* sp. (rat) bones, non-midden marine shell (1.3 g), and marine shell midden (8.6 g, see Marine Shell Midden Table following located at the end of Section 3.9). Charcoal from Feature 5 (0.4 g) was submitted for wood taxa identification. Wood taxa identification results included *Akoko (Chamaesyce* sp.*)*, *Kolomona (*cf. *Senna* sp.*)*, and *Kukui (Aleurites moluccana*) nutshell. All of the identified wood taxa were considered to be native or Polynesian-introduced trees or shrubs (see Wood Taxa Identification located at the end of Section 3.9).

Samples collected from Feature 6 consisted of a 4 L bulk sample at 0.82–0.93 mbs, a 5-gallon screened sample at 0.82–0.93 mbs, and an intact large piece of charcoal at 0.84 mbs. Material

collected from Feature 6 contained charcoal (1.6 g), volcanic glass (1.1 g), *Canis lupus familiaris* (dog) premolar tooth (0.3 g), vesicular basalt (14.5 g), non-midden marine shell (0.3 g), and marine shell midden (38.1 g) (see Marine Shell Midden Table located at the end of Section 3.9). Charcoal from Feature 6 (1.5 g) was submitted for wood taxa identification and radiocarbon dating. Wood taxa identification results included *‘Ōhi‘a lehua (*cf. *Metrosideros polymorpha), Kukui (Aleurites moluccana)* wood and nutshell, *Hau (Hibiscus tiliaceus), Niu (Cocos nucifers)* (coconut), *and Kī (*cf. *Cordyline fruticosa).* All of the identified wood taxa were considered to be native or Polynesian-introduced trees or shrubs (see Wood Taxa Identification located at end of Section 3.9). The charcoal identified as *Kukui* nutshell (0.26 g) was submitted for radiocarbon dating analysis, which yielded four possible date ranges, with a calibrated 2-sigma date of AD 1720 to AD 1820 (52.2%) being the most probable (see Radiocarbon Results located at the end of Section 3.9).

Samples collected from Feature 7 consisted of a 3 L bulk sample at 0.80-0.95 mbs. The bulk sample contained charcoal (0.2 g), non-midden marine shell (0.2 g), and marine shell midden (10.4 g, see Marine Shell Midden Table located at the end of Section 3.9). Charcoal from Feature 7 (0.2 g) was submitted for wood taxa identification. Wood taxa identification results consisted of *Niu (Cocos nucifers)* (coconut) and an unknown wood. The coconut palm is a Polynesian-introduced tree.

Samples collected from Feature 8 consisted of a 4 L bulk sample at 0.76-0.90 mbs, a 5-gallon screened sample at 0.76-0.80 mbs, pieces of charcoal at 0.90 mbs, and fire-cracked rock at 0.90 mbs. Material collected from Feature 8 contained charcoal (6.9 g), volcanic glass (1.1 g), small/medium mammal remains (0.5 g), butterfly fish bone (0.4 g), fire-cracked rock (184.5 g), a basalt fragment (0.1 g), non-midden marine shell (0.3 g), and marine shell midden (37.5 g, see Marine Shell Midden Table below). Charcoal from Feature 8 (0.9 g) was submitted for wood taxa identification and radiocarbon dating. Wood taxa identification results included *Niu (Cocos nucifers)* (coconut), *Akoko (Chamaesyce* sp.*), Kolomona (*cf. *Senna* sp.*), ‘Ilima (*cf. *Sida fallax), ‘Āheahea (Chenopodium oahuense), Kī (*cf. *Cordyline fruticosa), Kukui (Aleurites moluccana)* nutshell, and *Lama* (*Diospyros sandiwicensis*). All of the identified wood taxa were considered to be native or Polynesian-introduced trees or shrubs (see Wood Taxa Identification below). The charcoal identified as coconut nutshell (0.06 g) was submitted for radiocarbon dating analysis, which yielded three possible date ranges, with a calibrated 2-sigma date of AD 1630 to AD 1690 (44.7%) being the most probable (see Radiocarbon Results located at the end of Section 3.9).

Samples collected from Feature 9 consisted of a 1 L bulk sample at 0.76–0.85 mbs. The bulk sample contained charcoal (0.1 g) and marine shell midden (8.3 g, see Marine Shell Midden Table located at the end of Section 3.9). Charcoal from Feature 9 (0.1 g) was submitted for wood taxa identification. Wood taxa identification analysis was unable to determine the represented plant species.

Samples collected from Feature 10 consisted of a 3 L bulk sample at 0.75–0.87 mbs. The bulk sample contained charcoal (0.2 g), waterworn basalt (5.3 g), *Rattus sp.* (rat) long bone (0.1 g), medium mammal remains (0.1 g), a trace amount of non-midden marine shell, and marine shell midden (4.7 g, see Marine Shell Midden Table located at end of Section 3.9). Charcoal from Feature 10 (0.2 g) was submitted for wood taxa identification. Wood taxa identification results included *‘Ōhi‘a lehua (*cf. *Metrosideros polymorpha)* and *‘Ilima (*cf. *Sida fallax).* All of the

identified wood taxa were considered to be native trees or shrubs (see Wood Taxa Identification located at end of Section 3.9).

Samples collected from Feature 11 consisted of a 4 L bulk sample at 0.78–0.94 mbs and a 5-gallon screened sample at 0.78–0.94 mbs. Material collected from Feature 11 contained charcoal (1.7 g), fish bone (0.2 g), basalt gravel (9.2 g), non-midden marine shell (0.1 g), and marine shell midden (19.9 g, see Marine Shell Midden Table located at end of Section 3.9). Charcoal from Feature 11 (1.7 g) was submitted for wood taxa identification and radiocarbon dating. Wood taxa identification results included *Kolomona (*cf. *Senna* sp.*), Niu (Cocos nucifers)* (coconut), *‘Ilima (*cf. *Sida fallax)* and *Kukui (Aleurites moluccana)* nutshell. All of the identified wood taxa were considered to be native or Polynesian-introduced trees or shrubs (see Wood Taxa Identification located at end of Section 3.9). The charcoal identified as coconut nutshell (0.15 g) was submitted for radiocarbon dating analysis, which yielded four possible date ranges, with a calibrated 2-sigma date of AD 1720 AD to AD 1820 AD (52.2%) being the most probable (see Radiocarbon Results located at end of Section 3.9). In addition to the bulk and screened samples collected from Feature 11, an articulated *Canis lupus familiaris* (small dog) was documented within Feature 11.

Four samples of volcanic glass collected from Stratum II between 0.73–0.76 mbs, 0.8–0.9 mbs (Feature 5), 0.82–0.93 mbs (Feature 6), and 0.76–0.9 mbs (Feature 8) were sent for EDXRF analysis. Specific source information is not available; however, the volcanic glass sample clearly does not match sources from Hawai‘i Island. All the samples were from “Group 1,” one of two distinct geochemical groups identified from the 35 City Center AIS EDXRF volcanic glass samples, likely representing different volcanic sources on O‘ahu (see EDXRF discussion in Volume IV).

The results of sample analysis indicated the relatively dense usage of this coastal area just south of Honolulu Harbor (Mamala Bay) during the late pre-Contact and/or early post-Contact time period. The buried A-horizon and feature contents containing midden materials suggest a temporary habitation function and/or food consumption activity.

GPR Discussion: A review of amplitude slice maps indicated linear features but not within the excavation boundaries. Reflectivity is relatively uniform throughout the grid and decreases with depth except for the linear features. A transition from higher reflectivity to lower reflectivity is observed at approximately 0.25 mbs.

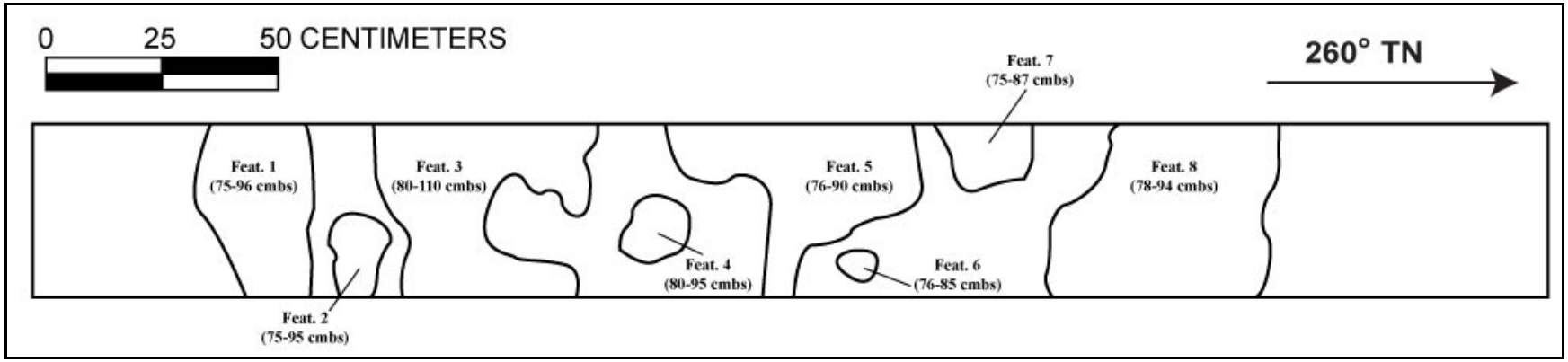
GPR depth profiles for Excavation 226B identify horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.2 mbs. Anomalies are observed in the profile but not within excavation boundaries. The maximum depth of clean signal return was approximately 0.9 mbs.

Summary: T-226B was excavated to the coral shelf at a depth of 1.48 mbs and beneath the water table, which was present at 1.36 mbs. The stratigraphy of T-226B consisted of fill (Ia and Ib) overlying the former land surface (II) and natural sediment (III to V) to the coral shelf. The stratigraphy of T-226B did not conform to the USDA soil survey designation of Fill land (FL). Eleven historic artifacts were collected during hand excavation of the buried A-horizon (Stratum II) within T-226B. There were no attributes that could provide a manufacturing date range. A

total of eight features (Features 4-11) were documented within T-226B as originating from the buried A-horizon (Stratum II) into underlying natural Jaucas sand (Stratum III). The eight features within T-226B have been designated as Features 4-11 of SIHP #50-80-14-2918. Additional faunal remains were collected from the buried A-horizon (Stratum II) and included *Bos taurus*, *Sus scrofa*, and *Canis lupus familiaris* skeletal elements. A total of 26 samples were collected from the buried A-horizon (Stratum II) and associated features (Features 4-11) within T-226B. The results of sample analysis indicated the relatively dense usage of this coastal area just south of Honolulu Harbor (Mamala Bay) during the late pre-Contact and/or early post-Contact time period. The buried A-horizon and feature contents containing midden materials suggest a temporary habitation function and/or food consumption activity. SIHP #50-80-14-2918, has also been identified within T-226A, T-226C, T-227, and T-227A.

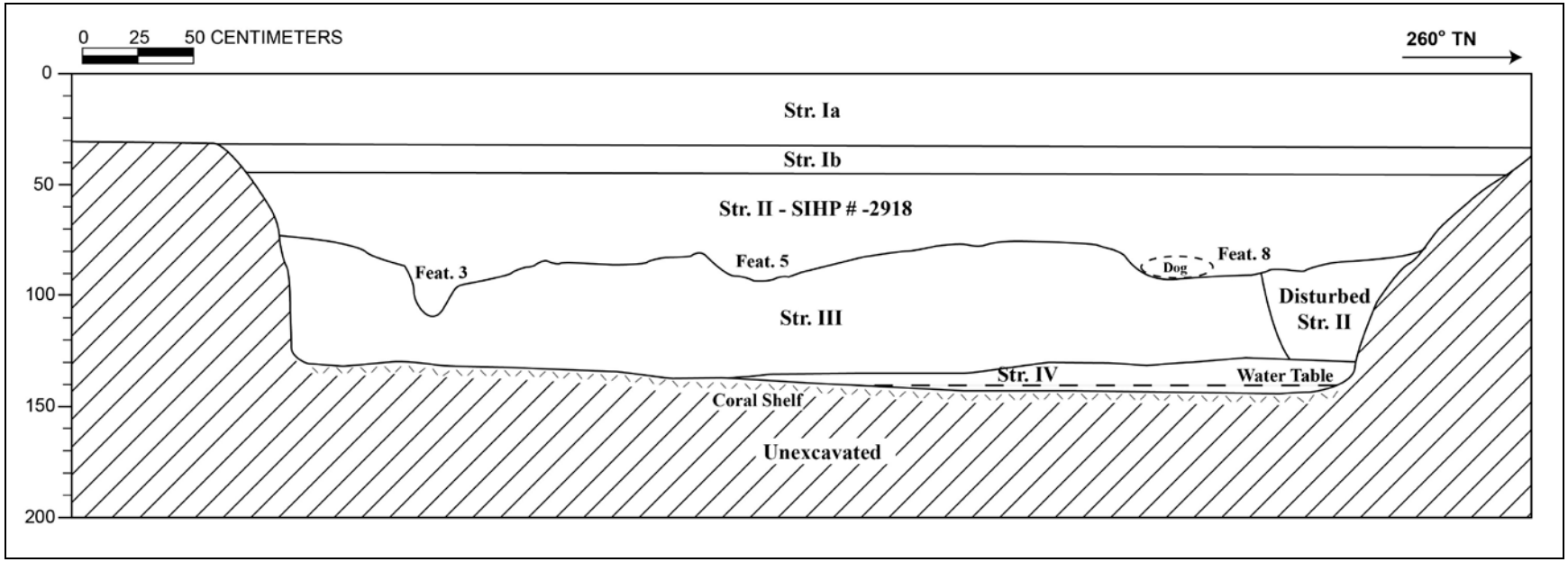
T-226B at start of excavation, view to southeast

T-226B southeast wall profile



T-226B plan view

T-226B Stratum II excavation floor showing Features 1–8, view to west



T-226B southeast wall profile

T-226B Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–32	Asphalt; road surface
Ib	32–45	Fill; 10 YR 8/3 (very pale brown); extremely gravelly sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, smooth lower boundary; crushed coral base course
II	45–110	Natural; A-horizon; 10 YR 5/3 (brown); sandy loam; weak, fine crumb structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, wavy lower boundary; contained traditional and historic artifacts, midden, fire-cracked rock, charcoal, and eight documented pit features
III	103–148	Natural; 2.5 Y 7/4 (pale yellow); medium-grain sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; clear, smooth lower boundary; Jaucas sand
IV	127–142	Natural; GLEY 1 6/1 (greenish gray); clayey sand; structureless; single-grain structure; wet, non-sticky consistency; non-plastic; marine origin; lagoon marine sandy clay
V	130–148	Natural; coral shelf

T-226B Ceramic Vessel earthenware and stoneware fragments (Acc. #226B-A-1 to A-2) interior, Stratum II

T-226B Ceramic Vessel earthenware and stoneware fragments (Acc. #226B-A-1 to A-2) exterior, from Stratum II

T-226B Faunal Analysis Table

Acc. #	Stratum	Depth(mbs)	Feature	Family/Class	Species	Element	Description	Modification
226B-F-1	II	0.53–0.76	-	Bovidae (cow)	*Bos taurus*	Diaphysis section (possible humerus); Diaphysis section	Fragment	Butchered (cut with metal blade)
226B-F-2	II	0.53–0.76	-	Suidae (pig)	*Sus scrofa*	Cranial; Mandible; Vertebra; Ribs; Molar; Premolar (pieces mend); Canine	Fragments	None
226B-F-3	II	0.90	8	Canidae (dog)	*Canis lupus familiaris* (small dog)	Cranial/Parietal; Mastoid process (unsided); Styloid process; Left frontal bone; Right frontal bone (with supra orbital ridge; Maxillary 3rd molar; Left innominate (Ala) (pieces mend); Right Innominate (Ala) (pieces mend); Sacrum; Thoracic vertebrae; Cervical vertebrae; Caudal vertebrae; Ribs; Intermediate phalanxes; Left ulna (proximal portion); Left lunate; Right lunate; Metacarpi; Left femur diaphysis (proximal portion); Right femur diaphysis (proximal portion); Femoral head fragment (unsided) (pieces mend); Femoral head fragment (unsided); Diaphysis sections; Irregular bones; Left tibia (distal portion); Metatarsi; Left cuneiform; Left calcaneus; Right calcaneus	Fragments/complete	None

T-226B Stratum II (0.6–0.65 mbs) Marine Shell Midden

Exc. #	Stratum	Depth (mbs)	Weight (g)	Midden Type
T-226B	II	0.60–0.65	4.4	Turbinidae *Turbo sandwicensis*
			3.1	Conidae *Conus sp.*
			2.9	Shell (burned)
			1.4	Neritidae *Nerita picea*
			1.0	Tellinidae *Tellina palatam*
			0.5	Echinodermata *mathaei sp./diadema sp.*
			0.5	Mytilidae *Brachidontes crebristriatus*
			0.4	Trochidae *Trochus sp.*
			0.3	Strombidae *Strombus sp.*
			0.3	Tellinidae
			0.1	Crustacean

T-226B Stratum II (0.73–0.76 mbs) Marine Shell Midden

Exc. #	Stratum	Depth (mbs)	Weight (g)	Midden Type
T-226B	II	0.73–0.76	7.6	Mytilidae *Brachidontes crebristriatus*
			5.9	Cypraeidae *Cypraea caputserpentis*
			2.7	Strombidae *Strombus sp.*
			2.4	Neritidae *Nerita picea*
			2.1	Tellinidae *Tellina spp.*
			1.6	Turbinidae *Turbo sandwicensis*
			1.2	Echinodermata *diadema sp./mathaei sp.*
			1.2	Isognomidae *Isognomon sp.*
			0.9	Cymatiidae
			0.4	Crustacean
			0.2	Neritidae *Nerita polita*
			0.1	Trochidae *Trochus sp.*

T-226B Feature 1 Marine Shell Midden

Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226B	1	0.81–0.96	13.6	Mytilidae *Brachidontes crebristriatus*
			2.2	Turbinidae *Turbo sandwicensis*
			1.0	Neritidae *Nerita picea*
			1.0	Tellinidae *Tellina palatam*
			0.5	Echinodermata *diadema sp./mathaei sp.*
			0.2	Tellinidae
			0.1	Gastropod
			<0.1	Isognomidae *Isognomon sp.*
			0.1	Strombidae

T-226B Feature 2 Marine Shell Midden

Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226B	2	0.80–0.95	5.1	Mytilidae *Brachidontes crebristriatus*
			0.9	Trochidae *Trochus sp.* (burned)
			0.6	Echinodermata *mathaei sp./diadema sp.*
			0.1	Crustacean (burned)
			1.7	Neritidae *Nerita picea*
			0.2	Tellinidae *Tellina palatam*

T-226B Feature 3 Marine Shell Midden

Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226B	3	0.82–0.93	15.3	Mytilidae *Brachidontes crebristriatus*
			3.8	Neritidae *Nerita picea*
			2.4	Neritidae *Theodoxus neglectus*
			1.8	Echinodermata *diadema sp./mathaei sp.*
			1.5	Cymatiidae *Cymatium gutturnium*
			1.5	Neritidae *Theodoxus neglectus*
			1.3	Naticidae *Natica sp*
			0.1	Crustacean
			6.6	Trochidae *Trochus intextus*
			3.5	Turbinidae *Turbo sandwicensis*
			0.3	Strombidae *Strombus sp.*

T-226B Feature 4 Marine Shell Midden

Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226B	4	0.80–0.95	4.4	Mytilidae *Brachidontes crebristriatus*
			1.9	Strombidae *Strombus sp.*
			1.7	Tellinidae *Tellina spp.*
			0.9	Echinodermata *diadema sp./mathaei sp.*
			0.9	Neritidae *Nerita picea*
			0.4	Crustacean (burned)
			0.2	Trochidae *Trochus sp.*

T-226B Feature 5 Marine Shell Midden

Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226B	5	0.76–0.90	20.2	Mytilidae *Brachidontes crebristriatus*
			7.4	Tellinidae *Tellina palatam*
			2.2	Echinodermata *diadema sp./mathaei sp.*
			2.2	Neritidae *Nerita picea*
			1.4	Shell (burned)
			1.0	Crustacean
			0.9	Cymatiidae *Cymatium sp.*
			0.9	Trochidae *Trochus sp.*
			0.2	Conidae *Conus sp.*
			0.1	Lucinidae *Ctena bella*
			1.1	Naticidae *Natica sp.*

T-226B Feature 6 Marine Shell Midden

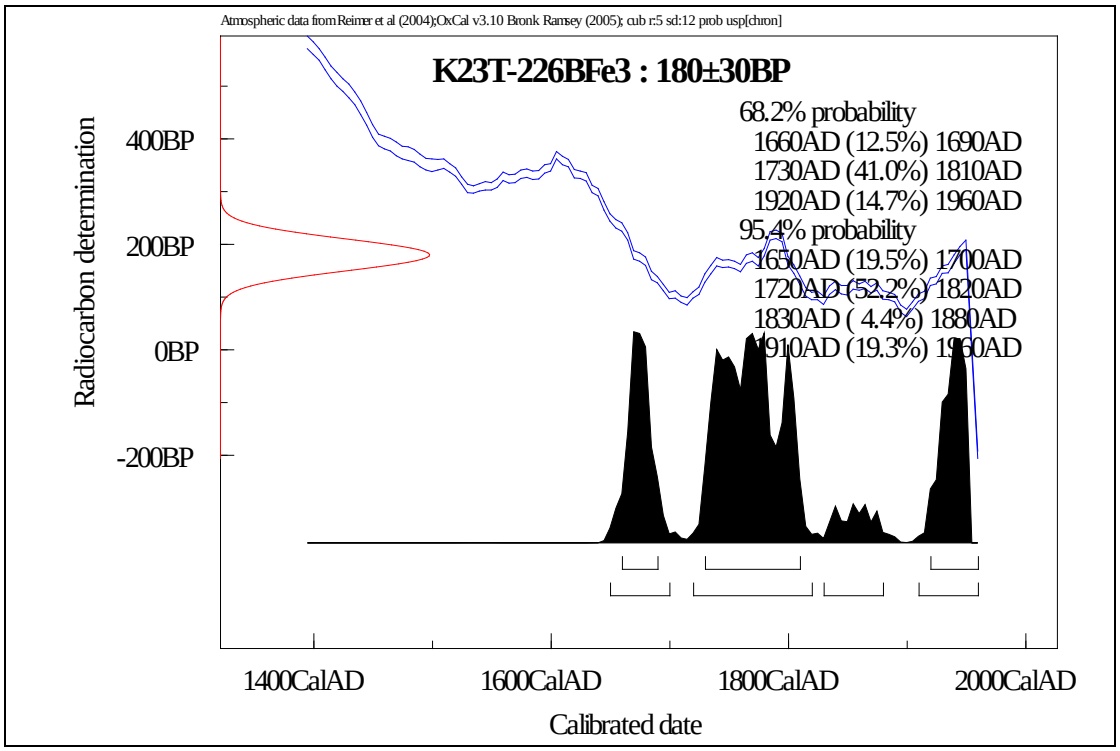
Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226B	6	0.76–0.85	2.3	Tellinidae *Tellina palatam*
			1.8	Mytilidae *Brachidontes crebristriatus*
			1.7	Naticidae *Natica gualteriana*
			1.4	Trochidae *Trochus sp.*
			0.9	Neritidae *Nerita picea*
			0.2	Echinodermata *mathaei sp./diadema sp.*

T-226B Feature 7 Marine Shell Midden

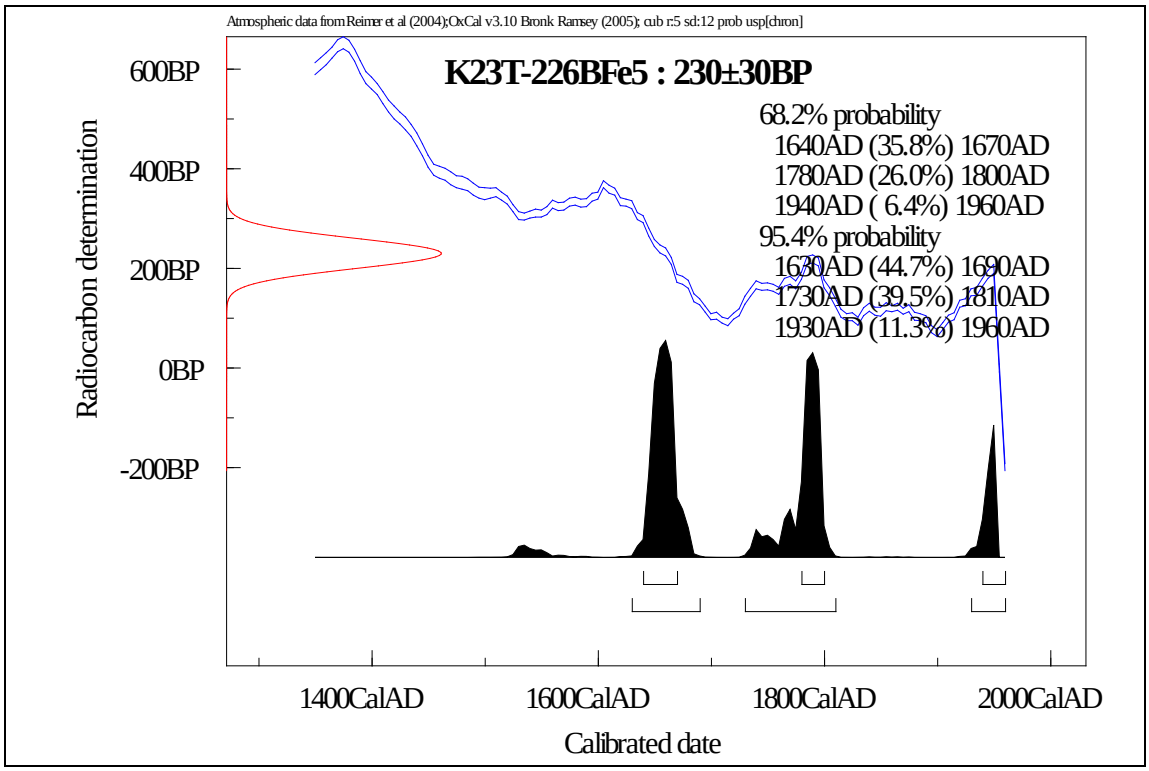
Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226B	7	0.75–0.87	2.5	Mytilidae *Brachidontes crebristriatus*
			0.7	Neritidae *Nerita picea*
			0.7	Tellinidae *Tellina palatam*
			0.5	Shell fragments (burned)
			0.1	Crustacean (burned)
			0.1	Echinodermata *mathaei sp./diadema sp.*
			0.1	Trochidae *Trochus sp.*

T-226B Feature 8 Marine Shell Midden

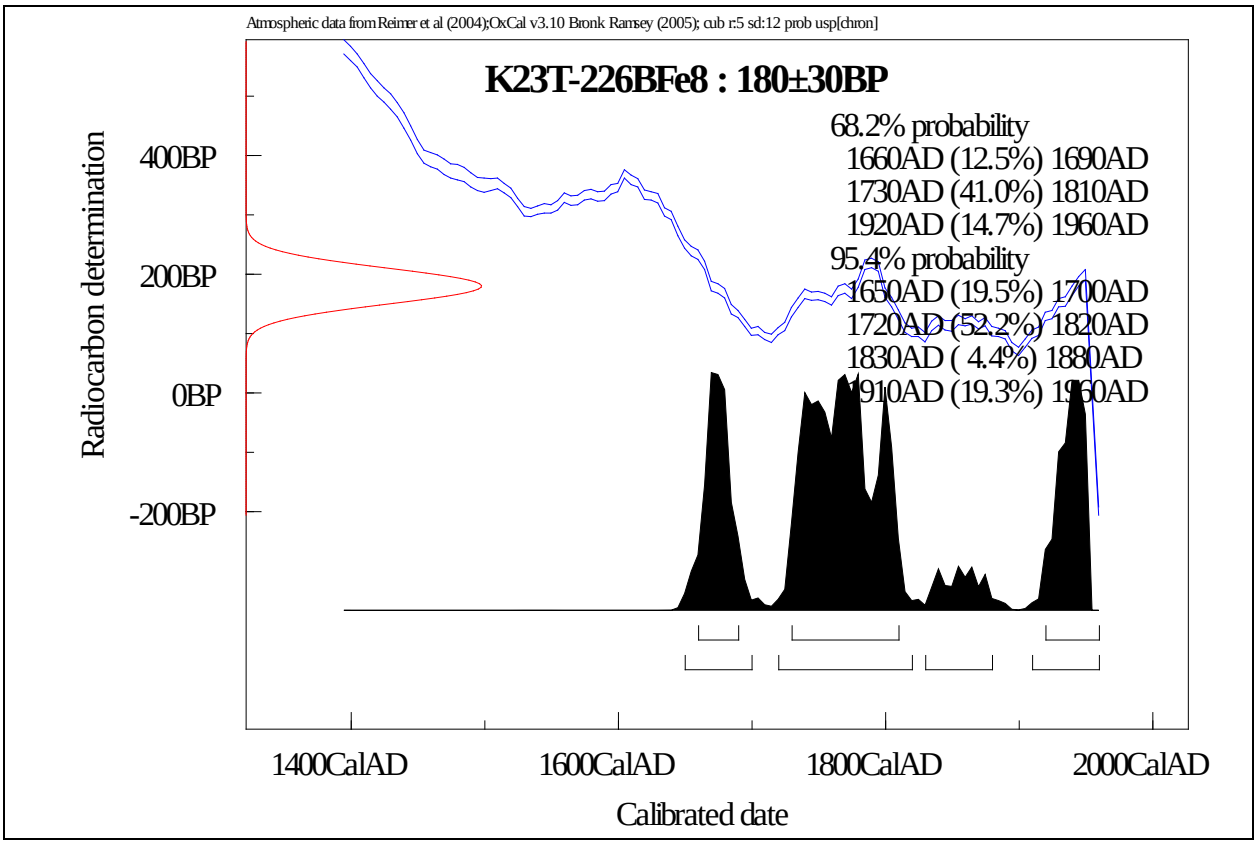
Exc. #	Feature	Depth (mbs)	Weight (g)	Midden Type
T-226B	8	0.78–0.94	10.6	Mytilidae *Brachidontes crebristriatus*
			2.7	Burned shell
			4.1	Neritidae *Nerita picea*
			0.6	Neritidae *Theodoxus neglectus*
			5.1	Tellinidae *Tellina palatam*
			1.0	Echinodermata *mathaei sp.*
			0.1	Echinodermata test
			0.3	Isognomidae *Isognomon sp.*
			0.2	Trochidae
			0.4	Trochidae *Trochus sp.*
			0.2	Turbinidae *Turbo sandwicensis*
			0.1	Crustacean
			0.7	Strombidae *Strombus sp.*
			0.1	Tellinidae
			13.2	Conidae *Conus sp.*



T-226B Feature 6 Radiocarbon Results



T-226B Feature 8 Radiocarbon Results



T-226B Feature 8 Radiocarbon Results

4.10 Test Excavation 226C (T-226C)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-027 [Plat]
Elevation Above Sea Level:	1.53 m
UTM:	617920.4822 m E / 2356009.170 m N
Max Length/Width/Depth:	6.44 m / 0.72 m / 1.37 mbs
Orientation:	104 / 284° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 226C (T-226C) was located in the westbound turn lane of Punchbowl Street onto Ala Moana Boulevard, approximately 6.7 m northeast of the intersection. A utility line was located approximately 1.7 m to the west. T-226C was located on property owned by the City and County of Honolulu. T-226C was added to increase testing coverage area due to utility relocation and to further investigate subsurface cultural deposits designated SIHP # 50-80-14-2918. The excavation area was level with the surrounding land surface.

Summary of Background Research and Land Use: Land Court Application 345 Map 1 indicated that T-226C was originally situated on land awarded to V. Kamāmalu as part of LCA 7712. S. E. Bishop’s map of the Kewalo area of Honolulu (1884) indicated that T-226C was originally located approximately 5.0 m southeast and inland of the former shoreline, approximately 30 m north of the Immigrant Depot (on present-day Ala Moana Boulevard), and less than 100 m southeast of the Marine Railway. According to the map, the east end of the excavation location cuts into an unnamed previous structure next to an unnamed road. In a map of Honolulu by W. A. Wall (1887), the unnamed road is named Kaka‘ako Street and the structure has split into two buildings. In a 1904 map by Newton, Kaka‘ako Street has became an extension of Punchbowl Street and the two structures remain at the location. Further development in the immediate vicinity included a reduction in the size of the structures at the entrance to the Marine Railway to allow the construction of Ala Moana Boulevard, the Bishop Estate Wharf on the opposite side of Ala Moana Boulevard across from T-226C, and the Honolulu Iron Works in the large parcel southeast of T-226C. A 1914 Sanborn Fire Insurance map identifies the T-226C location as partially within a “Boat Building” and into Ala Moana Boulevard, and the Bishop Estate Wharf became the “Inter Island Steam Navigation Co., Boat Building and Marine Railroad.” A review of historic maps and aerial photographs indicated that the addition of the westbound turn lanes on Punchbowl Street to Ala Moana Boulevard at the location of T-226C did not occur prior to the 1970s.

Previous archaeology of the immediate vicinity of T-226C includes three studies. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street and South Street and from Pohukaina Street to near Ala Moana Boulevard (Yent 1985). The Department of Land and Natural Resources conducted the fieldwork and identified the burials in a sand deposit within

burial pits located beneath approximately 1 m of fill. The exact location of the five burials within the study area was not recorded, although the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. All five burials were assigned SIHP #50-80-14-2918 and were disinterred.

Between 1986 and 1988, CSH conducted archaeological monitoring within the Hawai‘i Community Development Authority’s Kaka‘ako Improvement District 1 (ID-1), which included Punchbowl Street, Ala Moana Boulevard, and the location of T-226C (Pfeffer et al. 1993). A total of 149 burials were documented and disinterred during archaeological monitoring within Kaka‘ako Improvement District 1 from four specific burial areas consisting of two cemeteries and two isolated burials: Queen Street (116 burials assigned SIHP #50-80-14-4534); South Street (31 burials assigned SIHP #50-80-14-3712); Halekauwila Street (1 burial assigned SIHP #50-80-14-4532); and Punchbowl Street (1 burial assigned SIHP #50-80-14-4533). The one burial that was identified on Punchbowl Street was located at the King Street intersection.

In 2007, CSH conducted archaeological monitoring along Ala Moana Boulevard and Nimitz Highway from Fort Street Mall and Pi‘ikoi Street for resurfacing and subsurface utility installations (Petry et al. 2009). Most of the construction required excavations less than 0.6 mbs, except for traffic signals that reached depths of 2.0 mbs. No historic properties were documented during archaeological monitoring of the project.

Documentation Limitations: T-226C was excavated to a depth of 1.37 mbs in natural sediment and beneath the water table which was present at 1.25 mbs. Excavation was limited in the northwestern end due to four PVC utility lines that extended perpendicularly into the excavation sidewalls. A backhoe was used to remove the upper fill strata. Hand excavation was initiated through locally-procured mixed fill (designated Stratum Ic) due to the potential for displaced cultural material content.

Two features (designated Feature 12 and Feature 13) were encountered at the interface of the redeposited sand fill (Stratum Id) with the natural sediment (Stratum II). Two features (designated Feature 29 and Feature 30) were encountered during initial hand excavation, extending from the base of the locally-procured mixed fill (Ic) to within the locally-procured sand fill (Id). Each feature was documented and sampled (see Sample Results below). Feature 13 was located in the central portion of the excavation and contained a previously disturbed human burial consisting of a pelvis with no articulating leg element. Excavation was stopped in the immediate vicinity of the burial. The remains were covered and secured and a 50 cm buffer was placed around the burial within the excavation. Hand excavation continued within the northwest and southeast ends of the excavation area to beneath the water table.

Stratigraphic Summary: The stratigraphy of T-226C consisted of fill overlying natural sediment. Observed strata included asphalt (Ia), clay loam utility fill (Ib), locally-procured mixed loamy sand fill (Ic), and locally-procured sand fill (Id) overlying natural Jaucas sand (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land.

Artifacts Discussion: Two glass fragments (Acc. #226C-A-1 to A-2, see following photograph) from two bottles were collected from the backfill associated with Stratum Id. One bottle was used between 1900-1909 by the Consolidated Water Works, which had a bottling works in

downtown Honolulu. Artifacts collected from Stratum Id indicated a post-early twentieth century date.

Features Discussion: A total of four features (Features 12-13, 29-30) were documented within T-226C. Feature 12 was documented as a truncated pit that was observed at the lower boundary of the locally-procured sand fill (Id) extending to within natural Jaucas sand (II). Feature 13 was documented as a burial pit containing a previously disturbed burial that was observed at the lower boundary of the locally-procured sand fill (Id) extending to within natural Jaucas sand (II). Feature 29 and Feature 30 were documented as extensions of the locally-procured mixed loamy sand fill (Ic). The buried A-horizon (II) was designated a component of SIHP #50-80-14-2918, which was also identified within T-226A, T-226B, T-226D, T-227, and T-227A. The four features within T-226C were designated as Features 12-13, and Features 29-30 of SIHP #50-80-14-2918. SIHP #50-80-14-2918 Features 4-11 were identified within T-226B.

SIHP #50-80-14-2918 Feature 12 originated at 1.14 mbs and terminated at 1.39 mbs; which was 9.0 cm below the documented water table. Feature 12 was oval-shaped in plan and measured 30.0 cm long by more than 7.0 cm wide, extending into the south sidewall. In profile, Feature 12 was observed as being horizontally truncated by overlying sand fill (Id). The pit was clearly defined with straight sides and a rounded base. A 1 gallon bulk sediment sample was collected from Feature 12 (see Sample Results below). Feature 12 was interpreted as a remnant pit feature that once extended from the base of the former land surface (A-horizon), but has been disturbed and horizontally truncated by fill deposits. The function of Feature 12 is indeterminate.

SIHP #50-80-14-2918 Feature 13 originated at 1.15 mbs and terminated beyond the base of excavation (1.37 mbs). The Feature 13 burial pit was generally circular-shaped in plan and measured 45.0 cm long by more than 23.0 cm wide, extending into the south sidewall. Feature 13 was not observed in profile as excavation was ceased upon the discovery of human skeletal remains consisting of a pelvis with no articulating leg elements. No determination of sex or ancestry of the skeletal remains was made. Feature 13 was covered, a 50 cm buffer was formed, and the buffer and feature were pedestaled as excavation continued to beneath the water table to the northwest and southeast. Feature 13 is considered to be a burial pit containing human skeletal remains that once extended from the base of the former land surface (A-horizon), but has been disturbed and horizontally truncated by fill deposits.

SIHP #50-80-14-2918 Feature 29 originated at 0.78 mbs and terminated at 0.97 mbs. Feature 29 was circular-shaped in plan and measured 42.0 cm long by more than 21.0 cm wide, as it extended into the north sidewall at the east end of the excavation. In profile, Feature 29 was observed as a diffuse pit with downward tapering sidewalls and a rounded bottom. A 2 gallon bulk sediment sample was collected from Feature 29, and the remainder of the feature (approximately 5 gallons) was hand excavated and screened (see Sample Results below). The sediment comprising Feature 29, as well as the sediment of the associated fill layer (Ic) appears to be former culturally-enriched sand A-horizon material that was locally procured, mixed with other fill material, and redeposited. The stratigraphic association with fill deposits (Ic) above the former land surface indicated that Feature 29 likely post-dates Feature 12 (pit feature) and Feature 13 (burial).

SIHP #50-80-14-2918 Feature 30 originated at 0.70 mbs and terminated at 1.13 mbs. Feature 30 was circular-shaped in plan and measured 30.0 cm long by more than 15.0 cm wide as it

extended into the north sidewall in the center portion of the excavation. In profile, Feature 30 was observed as a pit with straight sides and a slightly rounded base containing a preserved wooden post and fire-cracked rock. Feature 30 is interpreted as a post mold containing a preserved post. The stratigraphic association with fill deposits (Ic) above the former land surface indicated that Feature 30 likely post-dates Feature 12 (pit feature) and Feature 13 (burial).

Terrestrial Faunal Remains Collected During Excavation: Faunal remains of a cow (*Bos taurus*), dog (*Canis lupus familiaris*), chicken (*Gallus gallus*), and pig (*Sus scrofa*) were encountered during hand excavation of Stratum Id, between 0.73 mbs to 1.15 mbs (see Faunal Analysis Table located at end of Section 3.10). The osseous remains identified as cow included the following: scapulae, a rib fragment, a humerus fragment, a tibia fragment, and a vertebral fragment. All identified cow elements exhibited cut marks indicative of butcher tool marks. The osseous material identified as dog included: a left tibia epiphysis, left proximal femur fragment, left distal ulna fragment, innominate fragments, left first molar with open apices, right proximal humerus, and right proximal radius. The unfused long bones and incomplete dental development indicated a subadult, or juvenile, dog. The osseous material identified as chicken included fragments from a left innominate, possible cranium, and possible tarsometatarus. A large tusk fragment was identified as originating from a pig. No cut marks or other modifications were noted on the dog, chicken, or pig remains. Most of the fragmented faunal material likely represents food remains.

Sample Results: Sediment samples were collected from Feature 12 and Stratum Id, Feature 29 for content analysis. A two gallon bulk sediment sample was collected from Stratum Id, from between 0.90 mbs and 1.00 mbs, and yielded charcoal (0.1 g), water-worn gastropods, crustaceans, and Echinodermata (6.8 g), micro-gastropods (0.1 g), and fish bone (0.1 g).

A one liter bulk sediment sample was collected from Feature 12, between 1.14 mbs and 1.39 mbs. The sample yielded charcoal (0.1 g), Neritidae (*Nerita picea*) (0.3 g), Echinodermata *mathaei sp.* (0.1 g), micro-shells (0.1 g), and fish bone (0.1 g).

Sediment samples from Feature 29 were obtained between 0.78 mbs and 0.97 mbs and included an approximately five gallon screened sample and a two gallon bulk sediment sample. The sample results for the samples were combined and yielded charcoal (4.3 g), crustacean (1.3 g), Mytilidae (*Brachidontes crebristriatus*) (0.1 g), burned wood (0.4 g), a green bottle glass fragment (0.8 g), burned unidentified faunal remains from a medium mammal (0.1 g), and fire-cracked rock (275.4 g).

GPR Discussion: A review of amplitude slice maps indicated linear features in the east side of the excavation but utility lines were observed in the west side. Reflectivity is relatively uniform throughout the grid and decreases with depth except for the linear features. A transition from higher reflectivity to lower reflectivity is observed at approximately 0.25 mbs.

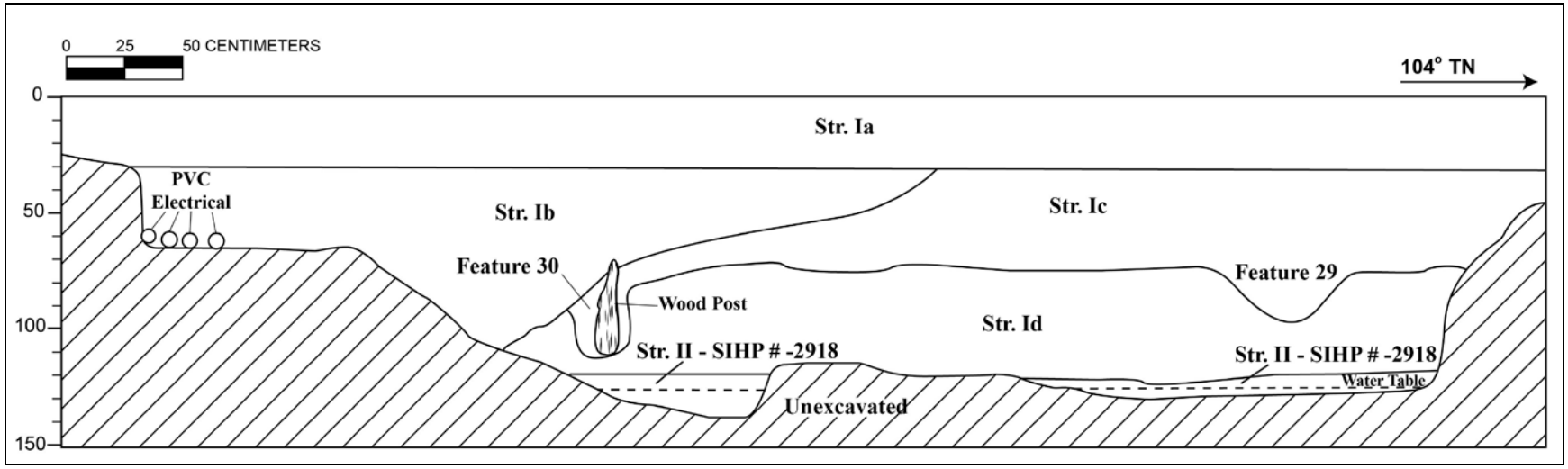
GPR depth profiles for T-226C identify horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.15 mbs. Several anomalies were observed on the profile but were not encountered during excavation and did not correspond to the utilities that were encountered. The maximum depth of clean signal return was approximately 1.0 mbs.

Summary: T-226C was excavated to a depth of 1.37 mbs in natural sediment and beneath the water table, which was present at 1.25 mbs. The stratigraphy of T-226C consisted of fill strata (Ia-Id) overlying natural sediment (II). The stratigraphy generally conformed to the USDA soil survey designation of Fill land. A total of four features (Features 12–13, 29–30) were documented within T-226C. The four features within T-226C were designated Features 12–13 and Features 29-30 of SIHP #50-80-14-2918. Two features were identified extending from the base of the locally-procured mixed loamy sand (Ic) and consisted of a pit of indeterminate function (Feature 29) and a post mold containing a preserved wooden post (Feature 30). A pit of indeterminate function (Feature 12) and a burial pit containing human skeletal elements (Feature 13) were identified just beneath the lower boundary of the fill strata at 1.15 mbs. Feature 12 and Feature 13 were considered to be remnant pits that once extended from the base of the former land surface (A-horizon), but were disturbed and horizontally truncated by fill deposits. Faunal remains of a cow (*Bos taurus*), dog (*Canis lupus familiaris*), chicken (*Gallus gallus*), and pig (*Sus scrofa*) were encountered in the fill of Stratum Id. Most of the fragmented faunal material likely represents food remains. The findings of T-226C indicated pre- and post-Contact land use of the area. SIHP #50-80-14-2918 was also identified within T-226A, T-226B, T-226D, T-227, and T-227A.

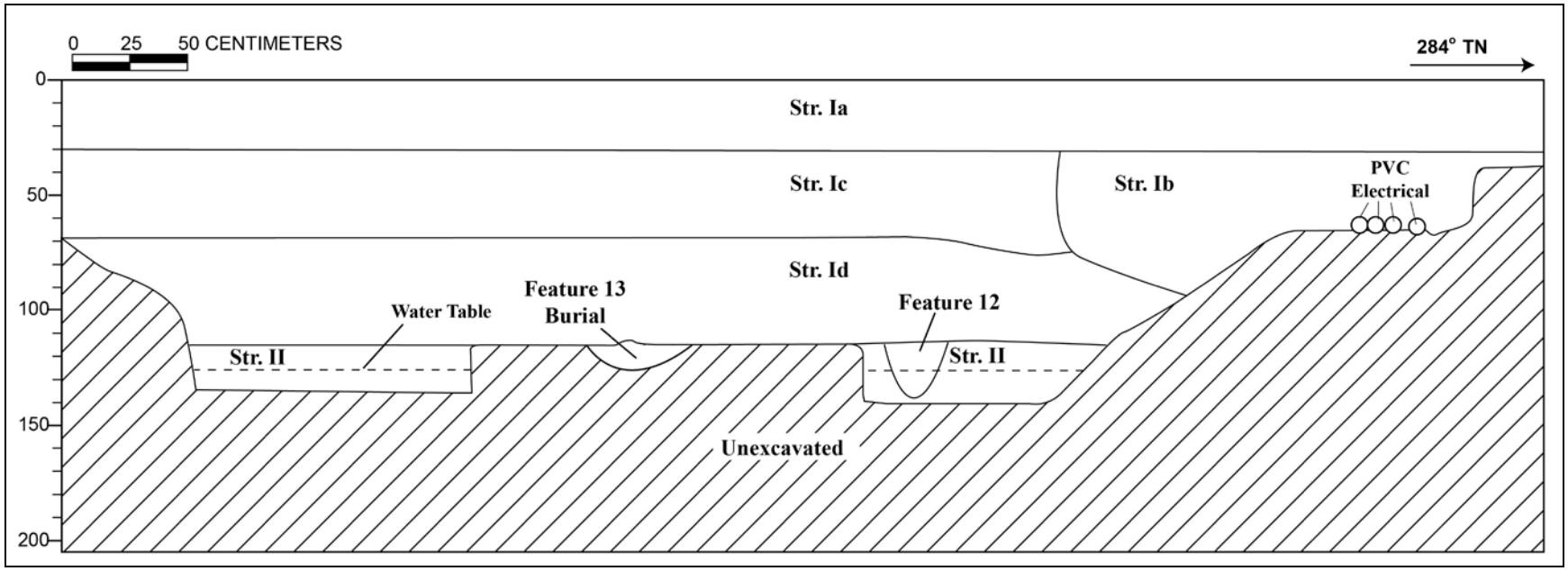
T-226C general location, view to east

T-226C north wall, view to northeast

T-226C south wall, view to southeast



T-226C north wall profile showing SIHP# -2918 Features 29 and 30



T-226C south wall profile showing SIHP# -2918 Feature 12 and 13

T-226C Stratigraphic Description of North Profile

Stratum	Depth (cmbs)	Description
Ia	0–31	Asphalt; road surface
Ib	31–110	Fill; 5 YR 3/3 (dark reddish brown); gravelly clay loam; weak, fine, crumb structure; moist, weakly coherent consistency; non-plastic; abrupt, broken/discontinuous lower boundary; utility trench fill
Ic	32–97	Fill; 10 YR 3/3 (dark brown) mottled with 10 YR 5/6 (yellowish brown); extremely gravelly loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; clear, broken/discontinuous lower boundary; mixed fill with crushed coral; may be locally procured and re-deposited A-horizon sediment with mixed fill
Id	73–120	Fill; 10 YR 5/4 (light yellowish brown); coarse grain sand; structureless, single-grain; moist, loose consistency; non-plastic; clear, smooth lower boundary; redeposited sand
II	120–137	Natural; 10 YR 6/4 (light yellowish brown); medium-grain sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; lower boundary not observed; Jaucas sand

T-226C Stratigraphic Description of South Profile

Stratum	Depth (cmbs)	Description
Ia	0–31	Asphalt; road surface
Ib	30–93	Fill; 5 YR 3/3 (dark reddish brown); gravelly clay loam; weak, fine, crumb structure; moist, weakly coherent consistency; non-plastic; abrupt, broken/discontinuous lower boundary; utility trench fill
Ic	30–75	Fill; 10 YR 3/3 (dark brown) mottled with 10 YR 5/6 (yellowish brown); extremely gravelly loamy sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; clear, broken/discontinuous lower boundary; mixed fill with crushed coral; may be locally procured and re-deposited A-horizon sediment with mixed fill
Id	68–115	Fill; 10 YR 5/4 (light yellowish brown); coarse grain sand; structureless, single-grain; moist, loose consistency; non-plastic; clear, smooth lower boundary; redeposited sand
II	115–137	Natural; 10 YR 6/4 (light yellowish brown); medium-grain sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; lower boundary not observed; Jaucas sand

T-226C glass bottle fragments (Acc. #226C-A-1 to A-2) collected from the backdirt pile associated with Stratum Id

T-226C overview of Feature 29 extending into north wall profile, view to north

T-226C overview of Feature 30 containing a wood post in the north wall, view to northeast

T-226C Faunal Analysis Table

Acc. #	Stratum	Depth(mbs)	Feature	Family/Class	Species	Element	Description	Modification
226C-F-1	Id	0.72–0.97	-	Bovidae (cow)	*Bos taurus*	Scapula; Scapula; Rib; Humerus; Tibia; Vertebra	Fragments	Butchered (cut with metal blade)
226C-F-2	Id	0.72–0.97	-	Canidae (dog)	*Canis lupus familiaris*	Left 1st molar (root apex open) (Juvenile); Right humerus (proximal portion) fragment (Juvenile); Right radius (proximal portion) (Juvenile); Left ulna styloid process; Left innominate fragment; Ala/acetabulum fragment; Right innominate; Left femur (proximal portion); Left tibia epiphysis	Fragments	None
226C-F-3	Id	0.72–0.97	-	Suidae (pig)	*Sus scrofa*	Large tusk	Fragment	None
226C-F-4	Id	0.72–0.97	-	Aves (chicken)	*Gallus gallus*	Left innominate; Cranial (possible); tarsometatarsus (possible)	Fragments	None

4.11 Test Excavation 226D (T-226D)

***Ahupua‘a*:**	Honolulu
LCA:	7712:6
TMK #:	2-1-027 [Plat]
Elevation Above Sea Level:	1.53 m
UTM:	618017.9387 mE 2356048.119 mN
Max Length/Width/Depth:	6.85 m / 0.80 m / 1.45 mbs
Orientation:	110 / 290° TN
Targeted Project Component:	Utility Relocation
USDA Soil Designation:	Fill land (FL)

Setting: Test Excavation 226D (T-226D) was located in the center of the west (*`ewa*) bound turn lanes on Punchbowl Street before the merge into Ala Moana Boulevard. Existing utilities near T-226D included a gas line 4.1 m to the southwest, a sewage line 9 m to the southwest, and a water line 11 m south of the excavation area. T-226D was located on property owned by the City and County of Honolulu. T-226D was added to increase testing coverage area for utility relocation due to redesign around human skeletal remains located in T-226C and to further investigate subsurface cultural deposits designated SIHP # 50-80-14-2918. The excavation area was level with the surrounding road surface.

Summary of Background Research and Land Use: Land Court Application 345 Map 1 indicated that T-226D was originally situated on land awarded to V. Kamāmalu as part of LCA 7712. S. E. Bishop’s map of the Kewalo area of Honolulu (1884) indicated that T-226D was approximately 5 m south of the former shoreline, approximately 35 m north of the Immigrant Depot (on present-day Ala Moana Boulevard), and approximately 100 m southeast of the Marine Railway. According to the map, the east end of the excavation location cuts into an unnamed previous structure next to an unnamed road. In a map of Honolulu by Wall in 1887, the unnamed road is named Kaka‘ako Street, the structure has split into two buildings, and there is greater development at the entrance to the Marine Roadway. In a 1904 map by Newton, Kaka‘ako Street has became an extension of Punchbowl Street and the two structures remain at the location. Further development in the immediate vicinity included a reduction in the size of the structures at the entrance to the Marine Railway to allow the construction of Ala Moana Boulevard, the Bishop Estate Wharf on the opposite side of Ala Moana Boulevard across from T-226D, and the Honolulu Iron Works in the large parcel southeast of T-226D. A 1914 Sanborn Fire Insurance map identifies the T-226D location as within a “Boat Building” and the Bishop Estate Wharf became the “Inter Island Steam Navigation Co., Boat Building and Marine Railroad.” A review of historic maps and aerial photographs indicated that the addition of the westbound turn lanes on Punchbowl Street to Ala Moana Boulevard at the location of T-226D did not occur prior to the 1970s.

Previous archaeology of the immediate vicinity of T-226D includes three studies. In 1985, excavations conducted at the former location of the Honolulu Iron Works encountered five human burials in a parcel of land between Punchbowl Street and South Street and from

Pohukaina Street to near Ala Moana Boulevard (Yent 1985). The Department of Land and Natural Resources conducted the fieldwork and identified the burials in a sand deposit within burial pits located beneath approximately 1 m of fill. The exact location of the five burials within the study area was not recorded, although the report notes the construction site as being at the intersection of Punchbowl Street and Pohukaina Street. All five burials were assigned SIHP #50-80-14-2918 and were disinterred.

Between 1986 and 1988, CSH conducted archaeological monitoring within the Hawai‘i Community Development Authority’s Kaka‘ako Improvement District 1 (ID-1), which included Punchbowl Street, Ala Moana Boulevard, and the location of T-226D (Pfeffer et al. 1993). A total of 149 burials were documented and disinterred during archaeological monitoring within Kaka‘ako Improvement District 1 from four specific burial areas consisting of two cemeteries and two isolated burials: Queen Street (116 burials assigned SIHP #50-80-14-4534); South Street (31 burials assigned SIHP #50-80-14-3712); Halekauwila Street (1 burial assigned SIHP #50-80-14-4532); and Punchbowl Street (1 burial assigned SIHP #50-80-14-4533). The one burial that was identified on Punchbowl Street was located at the King Street intersection.

In 2007, CSH conducted archaeological monitoring along Ala Moana Boulevard and Nimitz Highway from Fort Street Mall and Pi‘ikoi Street for resurfacing and subsurface utility installations (Petry et al. 2009). Most of the construction required excavations less than 0.6 mbs, except for traffic signals that reached depths of 2.0 mbs. No historic properties were documented during archaeological monitoring of the project.

Documentation Limitations: T-226D was excavated to a maximum depth of 1.45 mbs in natural sediment and beneath the water table, which was present at 1.32 mbs. There were no factors that limited documentation of T-226D. A backhoe was used to remove the asphalt (designated Stratum Ia) and part of the utility fill (designated as Stratum Ib). Hand excavation was initiated as portions of a railway were encountered within Stratum Ib between 0.40 mbs and 0.65 mbs. The railway portions included metal narrow-gauge rail I-beams and crushed coral bricks that crosscut diagonally through the central portion of the excavation. After documentation, the rail portions were cut and removed.

Stratigraphic Summary: The stratigraphy of T-226D consisted of fill overlying natural sediment. Observed strata included asphalt (Ia), extremely gravelly clay loam fill (Ib), and locally-procured redeposited sand fill (Ic-Id), overlying a medium-grain sand buried A-horizon (II), and natural Jaucas sand (III). The buried A-horizon (II) of T-226D has been designated as a component of SIHP #50-80-14-2918, a subsurface cultural deposit. The stratigraphy generally conformed to the USDA soil survey designation of Fill land.

Artifacts Discussion: Thirteen (13) historic artifacts (Acc. #226D-A-1 to A-19, see following table and photographs) were collected from T-226D, Stratum Ib, Ic, and III. These consist of nine ceramic fragments from seven vessels from Stratum Ib, one ceramic fragment from one vessel in Stratum IIb, two bottle fragments two bottles from Stratum Ib, and one brick fragment from Stratum Ic. One rail beam, one large spike, and four bricks, were found in Stratum Ib, and designated Feature 28. The glass bottle (Acc. #226D-A-9) was made between 1820–1890, and a stoneware bottle (Acc. #226D-A-1) was dated to 1835–1900. The rail section and a spike may be from the Honolulu streetcar system, which terminated near the shore on Ala Moana Boulevard at

the foot (*makai* end) of Punchbowl Street. Artifacts collected from T-226 D consist of domestic, construction, and transportation debris probably post-dating the mid to late nineteenth century.

Features Discussion: One feature (Feature 28) was identified within T-226D, which appears to be contemporaneous with the deposition of Stratum Ib. Feature 28 was identified at 0.65 mbs, and was comprised of metal rails (I-beams) and numerous yellow bricks and brick fragments. The feature measured 2.2 m long by more than 0.8 m wide, extending beyond the width of the excavation. Feature 28 appears to be the previously disturbed remnants of an historic structure or infrastructure with a possible transportation function. The buried A-horizon (II) was designated components of SIHP #50-80-14-2918, which was also identified within T-226A, T-226B, T-226C, T-227, and T-227A. Feature 28 was designated a component of SIHP #50-80-14-2918. Features 29–30 were identified within T-226C.

Terrestrial Faunal Remains Collected During Excavation: Faunal remains were encountered in strata Ib, Ic, and Id. Osseous material identified from the extremely gravelly imported clay loam fill (Stratum Ib) included the following: cow (*Bos taurus*) vertebrae fragments with butcher cut marks and rib portions; a pig (*Sus scrofa*) proximal left ulna fragment, right tibia, long bone fragment, and right lunate; and an unidentified fish spine fragment. Osseous material identified from the locally-procured redeposited sand fill (Stratum Ic) included: cow (*Bos taurus*) lumbar vertebra fragments, and butchered rib, tibia, and long bone fragments; pig (*Sus scrofa*) tooth fragment, carpal, and butchered long bone fragment; possible chicken (*Gallus gallus*) thoracic vertebra fragment; and a large vertebra fragment and possible large scapula from an unidentified fish. Faunal remains from Stratum Id included a butchered rib fragment and long bone section from a cow (*Bos taurus*) and 0.2 g of unidentified burned medium mammal remains. Butchering is indicated by cut mark striations and/or the fracture edge morphology on the remains. Most likely all of the faunal material encountered in T-226D represents historic or modern food remains.

Sample Results: A 1.5 liter bulk sediment sample was collected from Stratum II (former A-horizon) between 110–122 cmbs. The sample was wet-screened. The bulk sample from Stratum II yielded charcoal (2.3 g), shell material (10.3 g), rusted metal fragments (3.0 g), pig (*Sus scrofa*) remains (8.1 g), and 1.5 g of unidentified fish bones. Non-midden shell material was classified as micro-shells (2.7 g), gastropods/limpets (0.8 g), and Fasciolariidae (0.4 g). Midden-like shell material was classified as Mytilidae (*Brachidontes crebristriatus*) (2.7 g), Echinodermata *diadema sp./mathaei sp.* (1.9 g), and crustacean (1.8 g).

A 1.5 liter bulk sediment sample was collected from Stratum III at 120 cmbs. The sample was wet-screened. The bulk sample from Stratum III yielded charcoal (0.1 g) and shell material (3.9 g). The shell material was classified as gastropod fragments (1.3 g), Mytilidae (*Brachidontes crebristriatus*) (1.1 g), Tellinidae fragments (0.7 g), Naticidae (*Natica sp.*) juvenile (0.3 g), crustacean (0.2 g), Echinodermata *mathaei sp.* (0.2 g), and Hipponicidae (*Hipponix sp.*) (0.1 g).

The results of sample analysis support the identification of Stratum II as a subsurface cultural deposit as evidenced by the presence of metal fragments, faunal remains, and charcoal. Sample analysis also supports the identification of Stratum III as naturally-deposited marine sand.

GPR Discussion: A review of amplitude slice maps indicated linear features that correspond to the pipe and metal beams encountered during excavation. Reflectivity is relatively uniform

throughout the grid and decreases with depth except for the utilities. A transition from higher reflectivity to lower reflectivity is observed at approximately 25 mbs.

GPR depth profiles for T-226D identify horizontal banding, commonly associated with stratigraphic layering, throughout the survey area. This banding corresponds to variations of density and chemical composition within fill deposits. The profile also indicated a change in reflectivity occurring around 0.15 mbs and again around 0.4 mbs. An anomaly is observed in the profile and corresponds to the pipe and metal beams encountered during excavation. The maximum depth of clean signal return was approximately 1.0 mbs.

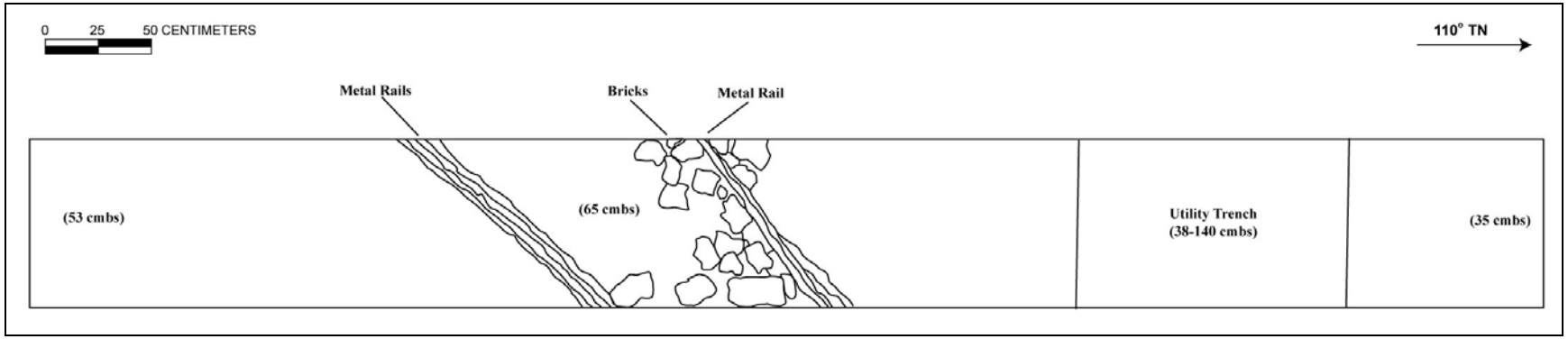
Summary: T-226D was excavated to a maximum depth of 1.45 mbs in natural sediment and beneath the water table, which was present at 1.32 mbs. The stratigraphy of T-226D consisted of fill (Ia to Id) overlying natural sediment (II and III). Thirteen (13) historic artifacts (Acc. #226D-A-1 to A-19, see following table and photographs) were collected from T-226D, Stratum Ib, Ic, and III. Artifacts collected from T-226D consist of domestic, construction, and transportation debris probably post-dating the mid to late nineteenth century. One feature (Feature 28) was identified within T-226D, which appears to be contemporaneous with the deposition of Stratum Ib. Feature 28 appears to be the previously disturbed remnants of an historic structure or infrastructure with a possible transportation function. Faunal remains were encountered in strata Ib, Ic, and Id. Most likely all of the faunal material encountered in T-226D represents historic or modern food remains. A 1.5 liter bulk sediment sample was collected from Stratum II (former A-horizon) between 110-122 cmbs, and a 1.5 liter bulk sediment sample was collected from Stratum III at 120 cmbs. Both bulk sediment samples were wet-screened. The results of sample analysis support the identification of Stratum II as a subsurface cultural deposit as evidenced by the presence of metal fragments, faunal remains, and charcoal. Sample analysis also supports the identification of Stratum III as naturally-deposited marine sand. The former land surface (II) and Feature 28 within T-226D were designated as components of SIHP #50-80-14-2918, which is described in Volume I. SIHP #50-80-14-2918 was also identified within T-226A, T-226B, T-226C, T-227, and T-227A.

T-226D general location, view to east

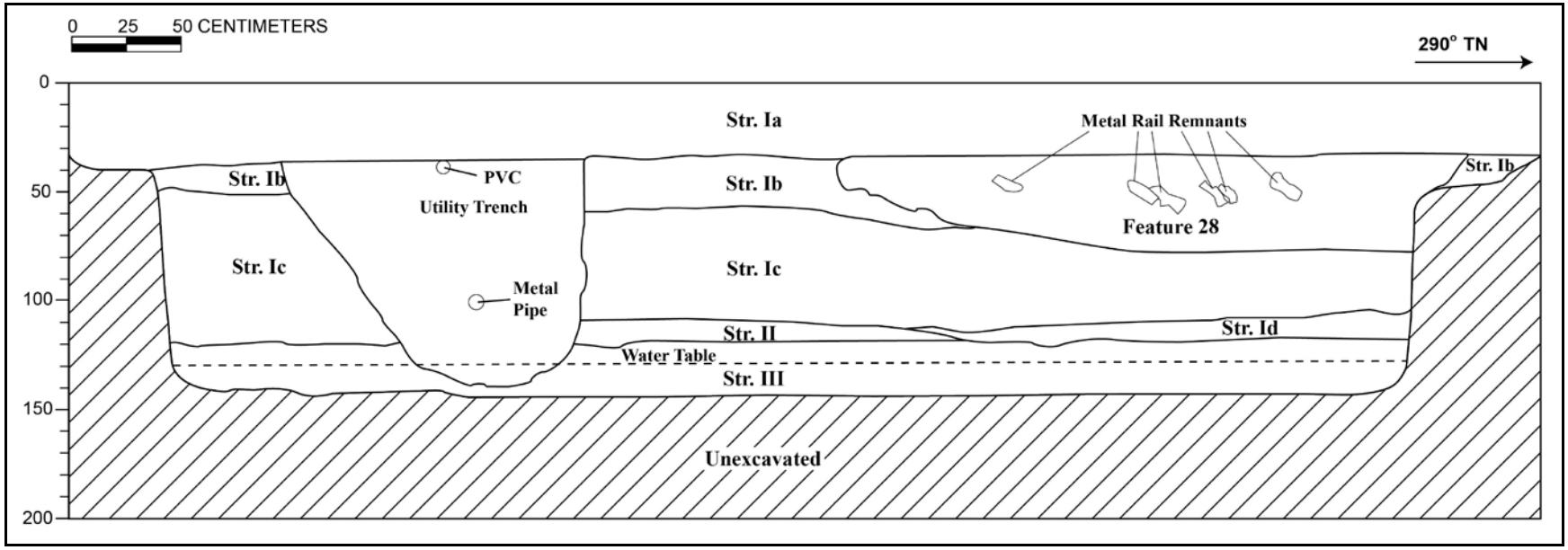
T-226D railway portions (narrow-gauge rail I-beams and bricks) encountered in Feature 28, view to west

T-226D south wall, view to west

T-226D north wall, view to east



T-226D plan view showing SIHP# -2918 Feature 28



T-226D south wall profile showing SIHP# -2918 Feature 28

T-226D Stratigraphic Description

Stratum	Depth (cmbs)	Description
Ia	0–35	Asphalt; road surface
Ib	35–68	Fill; 5 YR 3/3 (dark reddish brown); extremely gravelly loamy sand with about 80% subangular basalt gravel; structureless, single-grain; dry, loose consistency; no cementation; non-plastic; mixed origin; clear, smooth lower boundary; base course fill; contained historic debris; crushed coral cobbles and basalt boulders
Ic	60–113	Fill; 10 YR 3/3 (dark brown) mottled with 10 YR 5/5 (yellowish brown); medium-grain sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; diffuse and broken lower boundary; contained historic debris; redeposited locally-procured sand
Id	105–120	Fill; 10 YR 5/4 (light yellowish brown); coarse-grain sand; structureless, single-grain; moist, loose consistency; non-plastic; clear, smooth and broken/discontinuous lower boundary; contained historic debris; redeposited locally-procured sand
II	110–120	Natural, A-horizon; 10 YR 6/4 (light yellowish brown); medium-grain sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; diffuse, smooth and broken/discontinuous lower boundary; former land surface
III	120–145	Natural; 10 YR 5/1 (gray); medium-grain sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; lower boundary not visible; Jaucas sand

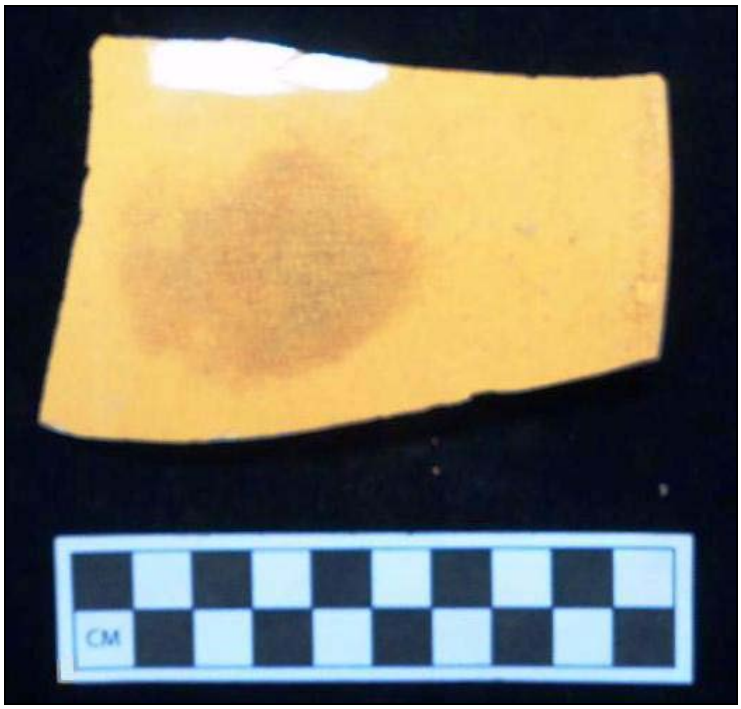
T-226D Artifact Analysis

Acc. #226D-A-	Provenience	Ceramic Vessel Type	Portion	No.	Paste; Decoration	Age; Origin	Comments
1	T-226D, St. Ib, Fea. 28	Bottle (English, 1835–1900)	Base	1	Stoneware	Anglo/ American 1835–1900	Two-tone Bristol-Glaze stoneware bottle
2	T-226D, St. Ib, Fea. 28	Dinnerware	Base	1	Porcelain; Painted overglaze	Asian	Four Flowers motif
3	T-226D, St. Ib	Unknown	Body	1	Earthenware, Coarse		
4	T-226D, St. Ib, Fea. 28	Unknown	Body	1	Stoneware		Possible bottle fragment
5	T-226D, St. Ib, Fea. 28	Dinnerware	Body	1	Earthenware, Refined		
6	T-226D, St. Ib, Fea. 28	Dinnerware	Body	2	Porcelain; Painted underglaze	Asian	Sweet Pea motif
7	T-226D, St. Ib, Fea. 28	Dinnerware	Body	1	Sponge, painted underglaze	Great Britain	Green, red, and yellow flowers (interior)
8	T-226D, St. Ib, Fea. 28	Dinnerware (Asian)	Rim	1	Porcelain; Painted underglaze	Asian	Bamboo motif
9	T-226D, St. III	Crock	Rim	1	Stoneware		
Acc. #226D-A-	**Provenience**	**Glass Bottle Type**	**Portion**	**No.**	**Color**	**Age; Origin**	**Comments**
10	T-226D, St. Ib, Fea. 28	Bottle	Neck-lip	1	Olive, Dark	1820–1890	
Acc. #226D-A-	**Provenience**	**Miscellaneous Type**	**Portion**	**No.**	**Material**	**Age; Origin**	**Description**
11	T-226D, St. Ib, Fea. 28	Brick	Complete	1		1978–present	Yellow color, machine-made, fire brick, rectangular
12	T-226D, St. Ib, Fea. 28	Brick	Partial	1		1978–present	Yellow color, machine-made, fire brick
13	T-226D, St. Ib, Fea. 28	Brick	Fragment	1			Yellow brown color, machine-made, fire brick
14	T-226D, St. Ib, Fea. 28	Brick	Fragment	1			Yellow brown color, machine-made, fire brick
15	T-226D, St. Ib, Fea. 28	Rail Beam	Fragment	1	Metal		Narrow –Gauge Railroad or streetcar rail beam

Acc. #226D-A-	Provenience	Miscellaneous Type	Portion	No.	Material	Age; Origin	Description
16	T-226D, St. Ib, Fea. 28	Spike	Complete	1	Metal		Round-head, not tapered
17	T-226D, St. Ic	Brick	Fragment	1			Red color

T-226D ceramic fragments (Acc. #226D-A-1 to A-9), interior, from left to right and top to bottom) from Stratum Ib

T-226D ceramic fragments (Acc. #226D-A-1 to A-8), exterior, from left to right and top to bottom) from Stratum Ib



T-226D ceramic fragment (Acc. #226D-A-9), from Stratum IIb

T-226D glass bottle fragments (Acc. #226D-A-10 to A-11), from Stratum Ib

T-226D Faunal Analysis Table

Acc. #	Stratum	Depth (cmbs)	Feature	Family/ Class	Species	Element	Description	Modification
226D-F-1	Ib	35–80	-	Bovidae (cow)	*Bos taurus*	Vertebra; Ribs	Fragments	Vertebra butchered (cut with metal blade)
226D-F-2	Ib	35–80	-	Suidae (pig)	*Sus scrofa*	Diaphysis section; Left ulna (proximal portion); Right tibiotarsus; Right lunate	Fragments	None
226D-F-3	Ib	65	-	Bovidae (cow)	*Bos taurus*	Vertebra	Complete	None
226D-F-4	Ic	80–110	-	Bovidae (cow)	*Bos taurus*	Ribs; Lumbar vertebra; Tibia; Diaphysis section	Fragments	Ribs; Tibia; Diaphysis section (very burned) Butchered (cut with metal blade)
226D-F-5	Ic	80–110	-	Suidae (pig)	*Sus scrofa*	Canine; Diaphysis section; Carpal (unidentified)	Fragments	Diaphysis section butchered (cut with metal blade)
226D-F-6	Ic	80–110	-	Aves (chicken)	*Gallus gallus* (possible)	Thoracic vertebra	Fragments	None
226D-F-7	Id	112	-	Bovidae (cow)	*Bos taurus*	Rib; Diaphysis section	Fragments	Rib butchered (cut with metal blade)